

STATE OF MICHIGAN INVESTMENT BOARD MEETING

September 16, 2021

State of Michigan Retirement System
Quarterly Investment Review



Rachael Eubanks, State Treasurer
Prepared by Bureau of Investments
Michigan Department of Treasury

STATE OF MICHIGAN INVESTMENT BOARD MEETING

SEPTEMBER 16, 2021

Agenda



- 9:30 a.m. Call to Order and Opening Remarks
- Approval of the 6/10/21 SMIB Meeting Minutes
- 9:35 a.m. Executive Summary & Performance for Periods Ending 6/30/21
- 9:45 a.m. Current Asset Allocation Review
- Markets Review and Outlook
- 10:00 a.m. Review of Investment Reports
- Private Equity – Receive and File
 - Domestic Equity – Receive and File
 - International Equity – Receive and File
 - Real Return & Opportunistic – Receive and File
 - Real Estate & Infrastructure – Receive and File
 - Fixed Income – Receive and File
 - Absolute Return – Receive and File
 - Defined Contribution – Receive and File
- Basket Clause – Receive and File
- Venture Capital Update
- 10:10 a.m. Guest Speaker:
- Jim Lim, Managing General Partner – Greenspring Associates
- 10:55 a.m. Public Comment
- 11:00 a.m. Closing Remarks ~ Adjournment



2021 Meeting Schedule

Thursday, December 9, 2021

All meetings start at 9:30 a.m.

State of Michigan Retirement System

MINUTES

State of Michigan Investment Board Meeting

September 16, 2021



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN INVESTMENT BOARD

June 10, 2021 Meeting Minutes

Board Members Present

Chairman – Treasurer Rachael Eubanks – via Microsoft Teams - East Lansing, MI
Ms. Dina Richard – via Microsoft Teams – Kewadin, MI
Mr. Reginald Sanders – via Microsoft Teams – Portage, MI
Mr. James Nicholson – via Microsoft Teams – Detroit, MI
Mr. David Massaron – Absent

Members of the Public and Bureau of Investments Staff Present – via Microsoft Teams

Jon Braeutigam	Lori Barrett	Sandra Horbach
Robert Brackenburg	Patrick Moraniec	Todd Warstler
Karl Borgquist	Daniel Quigley	Jack Behar
Greg Parker	Woodrow Tyler	Semone James
Jim Elkins	Mark Porrell	Anthony Estell
Peter Woodford	Karen Stout	Lan Chen
Annette Russell	Molly Jason	Travis Haney
Janet Sudac	Meredith Chu	Allison Wardlaw
Ann Storberg	Pavel Stolarczyk	Rosa Moreno
Dick Holcomb	Tommy Conroy	Tim McEnery
Ryan Rathman	Betty Nicklesen	Blanche Quirante
Mary Pollock	Steve Cummings	Francis Lolli
Nick Whitman	Erin Mock	John Karagoulis
Anthony Edwards	Aaron Bandy	John Stark
Joanne Bump	Craig Coulter	Taylor Broekstra

Many others were present via Microsoft Teams teleconference.

Opening Remarks:

Rachael Eubanks called the meeting to order at 9:31 am.

Approval of Minutes:

Approval of the March 25, 2021 SMIB Meeting Minutes – Motion to approve by James Nicholson.
Seconded: Reginald Sanders. The vote was unanimous to approve.

AGENDA

Executive Summary

Mr. Jon Braeutigam, Chief Investment Officer for the Bureau of Investments, reviewed the executive summary performance section discussing performance returns and markets as of March 31, 2021.

Mr. Braeutigam stated that the annualized return for the one-year was 27.5%. He stated this is fantastic for the pension fund. No one knew what COVID-19 was going to bring to the markets and it turned out being very favorable. This is the best return for SMRS since 1998.

What the pension fund really needs however, is long term performance, therefore SMRS's goal is to perform over a long period of time. It is important to note that the three, five, seven and ten-year annualized returns are well over peer returns. One reason for obtaining this kind of return is having the right asset allocation. The board approves the asset allocation plan and we thank the board for this decision.

Mr. Braeutigam also stated that the fiscal year-to-date return is 15.9%. He briefly explained that the market value which stands at \$87.7 billion is a record amount. This record amount also includes a net payout of \$2.1 billion over the past year to the pensioners.

He further explained SMRS's market value by plan, SMRS's asset allocation, and its asset allocation targets and ranges and where SMRS is currently. Mr. Braeutigam stated that there were 19 new private market commitments for the quarter which made it a very busy time for the private markets divisions and legal team. He thanked them and the Attorney General's Department for their work.

Asset Allocation Review, Markets Review and Outlook

Mr. Gregory Parker, Director of Investments – Public Markets discussed the market review and outlook. He first discussed the Annual Returns of Key Asset Classes “quilt” chart and its contents, explaining that it's a good way to see the diversification within the pension fund. He explained that equity risk, which is seen in this chart as well, is needed in order to generate expected returns.

Mr. Parker discussed capital markets assumptions, stating that riskier assets are expected to deliver higher returns. He discussed the S&P 1500 returning 13.7% over the past 10 years. The composition of these returns is 7.5% per year due to the growth in earnings per share and dividends and the remainder was due to multiple expansion. There was a sharp correction in 2020 that lost almost four years of returns. It was the fastest bear market on record, at just 33 days. Since the bottom, the market has rallied 80% through the end of March.

Mr. Parker also discussed international equity, stating it has grown at a rate of 5.5% over the past 10 years, mostly due to multiple expansion. Of interest is that the all-time high in the international market was in October 2007 which dates back 14 years. He also discussed the US Treasury interest rate curve, and its shape and levels over the past several years through March 2021. The Board presented a couple of questions which were answered.

Review of Private Equity

Mr. Peter Woodford, Senior Investment Manager of the Private Equity Division discussed performance of the division through March 31, 2021. He stated that the division had good performance across all time periods but especially the annualized 10-year return which was just shy of 15%. Private equity also performed well relative to peers, ranking in the top 9% of peers over a 10-year period. He stated he is very proud of this performance.

Mr. Woodford explained that the consistent outperformance seen was attributed to strong equity markets, investment strategy and low turnover in staff. He believes that building institutional knowledge takes time, discipline, and experience.

Over the last quarter, the reported value of the portfolio has increased by about a billion dollars. This is largely driven by an increase in like-for-like comps as companies emerge from the pandemic and posted solid earnings. He went on to explain liquidity, outstanding commitments, and highlighted a few of the new investments including some in Michigan. He finished by providing an explanation of the division's strategy.

Guest Speaker – Sandra Horbach, Managing Director for The Carlyle Group

Ms. Horbach presented an excellent private equity market overview and investment outlook to the Board. She discussed private equity investment performance, stating that valuations are at all-time highs across asset classes including private equity. Private equity dry powder is also at all-time highs. She stated that the overall growth of private markets has exceeded capital flows into private equity creating an opportunity set that is even larger than the available dry powder, and it's continuing to grow.

The median private equity and venture capital allocation for a pension fund has increased 30% from 2010 to 2020. Carlyle expects interest rates to remain lower for longer which will likely drive continued increased allocation to private equity.

Sandra gave a brief Carlyle Partners overview stating that they are a \$260 billion global investment firm focused on creating value for their investors. They have been investing for over 30 years and their success is driven by an industry focused approach.

Ms. Horbach explained the group's investment strategy, describing their deep sector expertise, scaled platform and resources, intensive value creation capabilities, and global scale. She explained Carlyle's scaled platform and resources and their thoughtful portfolio construction. She then answered questions presented to her from the board.

Review of remaining Investment Reports and Basket Clause – Received and Filed**Public Comment:**

Veronica Sance from Los Angeles, CA, a member of the Downtown Crenshaw Rising group expressed her concerns regarding a proposed sale of the Baldwin Hills Crenshaw Mall whose largest investor is LACERA. She stated that the investment did not make any return under Capri Capital Investments and that the contract with Capri Capital has expired. She does not want this sale to go to an outside developer as she believes she and others will be displaced.

Aaron Wissner voiced a question regarding inflation, asking what pensioners should be doing if inflation is rising faster than the 3% increase they receive each year?

Closing Remarks

Chairman Eubanks thanked the speakers for their well-prepared presentations. She stated the next 2021 meetings are September 16 and December 9 and to stay in communication as these upcoming meetings may be in person.

Adjournment:

Motion to adjourn by Dina Richard. Seconded by James Nicholson. The meeting concluded at 11:05 am.

Approved:

Rachael Eubanks, Chairman

State of Michigan Retirement System

EXECUTIVE SUMMARY

State of Michigan Investment Board Meeting

September 16, 2021



Gregory J. Parker, CFA

Director of Investments – Public Markets

Director of Asset Allocation

Bureau of Investments

EXECUTIVE SUMMARY

June 30, 2021

Performance

Great peer comparison.

MPSERS Plan (6/30/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	33.4%	12.9%	12.8%	10.1%	10.4%
Policy Returns	26.4%	12.2%	12.0%	9.9%	10.2%
Peer Median Returns*	27.3%	11.4%	11.1%	8.7%	9.2%

*State Street Universe greater than \$10 billion.

- In aggregate, the SMRS market value as of June 30, 2021 was \$94.1 billion, which is the highest level in its history.
- Over the past one, three, five, seven, and ten years, the returns are significantly higher than peer median returns. The peers are defined as the State Street Universe of public pension plans greater than \$10 billion. Notably, the standard deviation of the monthly returns was in the lowest quartile for the longer time horizons.
- The past 1-year return of 33.4% is the highest annual return since 1983. According to State Street, comparing the plan returns to other public funds greater than \$10 billion, the returns are the highest among peers for the past seven-year period. Over the past ten, five and one-year time period, the returns are the second highest.
- Over a very long horizon, since 1979, the annualized rate of return on the plan assets has been approximately 9.7%.
- Compounding at higher than peer returns can add significant value. For example, based on the \$51.6 billion June 2011 market value, a ten-year annualized return of 10.4% compared to the 9.2% peer median return would add about \$14.4 billion in excess value.
- Most asset classes earned returns comparable to or better than peer median returns over the longer-term in addition to meeting or exceeding the asset class specific benchmarks.

Asset Allocation

A low return environment.

- Given the low rates of return available in the capital markets for safe assets, and in order to earn the actuarial rate of return, additional risks (primarily equity risk) must be assumed. At the end of June 2021, the equity risk (beta) is approximately 0.37 which is the lowest measurement in three decades, and it is lower than peer median at approximately 0.57.
- Liquidity is another fundamental risk assumed and it is managed through asset allocation. The plans have outstanding capital commitments to fund approximately \$13.8 billion in illiquid assets, primarily in private equity. In the June 2021 quarter, \$1.6 billion of new commitments were made.
- The combined systems paid out approximately \$1.8 billion net of contributions over the past twelve months ending in June 2021. Over the past year, the allocation to private equity was reduced by \$331 million, real estate by \$232 million, long-term fixed income was reduced by \$112 million, real return & opportunistic by \$77 million, absolute return by \$27 million, and domestic equity by \$19 million. The allocation to short-term cash decreased by approximately \$1.0 billion.

Investment Update*Highlighting the quarter.*

(\$ Millions)

NEW COMMITMENTS**April 1, 2021 – June 30, 2021**

Asset class	Fund Name / (Managed By)	Commitment
Private Equity		
	Insight Partners XII, L.P. (Insight Venture Management, LLC)	\$ 150.0
	KKR North America Fund XIII SCSp (KKR Alternative Investment Mgmt. Unlimited Co.)	125.0
	Apax Digital Fund II, L.P. (Apax Digital II GP Co. Limited)	100.0
	Genstar Capital Partners X, L.P. (Genstar Capital Partners, LLC)	100.0
	Hellman & Friedman Capital Partners X, L.P. (Hellman & Friedman, LP)	100.0
	Veritas Capital Vantage Fund, L.P. (Veritas Capital Fund Management, LLC)	60.0
	Accel Growth Fund VI, L.P. (Accel Growth Fund VI Associates, LLC)	25.0
	Genstar X Opportunities Fund I, L.P. (Genstar Capital Partners, LLC)	25.0
	TI Platform III, L.P. (TI Platform Fund III GP, LLC)	25.0
	Meritech Capital Partners Franchise Fund I, L.P. (Meritech Franchise Associates, LLC)	15.0
	Accel London VII, L.P. (Accel London VII Associates, LLC)	12.5
	Accel XV, L.P. (Accel XV Associates, LLC)	10.0
Real Estate and Infrastructure Division		
	Carlyle Realty Partners IX, L.P. (Carlyle Investment Management LLC)	100.0
	Heitman Global Real Estate Partners II, L.P. (Heitman Global Real Estate Partners GP, LLC)	100.0
	KKR Global Infrastructure Investors IV SCSp (KKR Alternative Invest. Mgmt. Unlimited Co.)	100.0
	Lion Industrial Trust (Clarion Partners, LLC)	100.0
	Transwestern Strategic Partners Fund III, L.P. (Transwestern Investment Group)	75.0
Real Return & Opportunistic Division		
	HPS Red Cedar Fund (HPS Investment Partners)	100.0
Fixed Income Division-Absolute Return		
	Acacia (Sixth Street Partners)	150.0
	PIMCO Aviation Co-Invest Vehicle Onshore Feeder, L.P. (PIMCO)	100.0
TOTAL		\$1,572.5

State of Michigan Retirement System

PERFORMANCE

State of Michigan Investment Board Meeting

September 16, 2021



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

Bureau of Investments

Mission Statement

The Bureau of Investments continually strives to provide quality investment management services, broad professional expertise, and independent advice to the State of Michigan Investment Board as fiduciary of the State of Michigan Retirement System, and independent of the Board, to the State Treasurer for various Michigan trust funds and the State's common cash, for which the State Treasurer is the fiduciary.

SMRS Goals

Maintain sufficient liquidity to pay benefits.

*Meet or exceed the actuarial assumption
over the long term.*

*Perform in the top half of the public plan
universe over the long term.*

Diversify assets to reduce risk.

*Exceed individual asset class benchmarks
over the long term.*

MPERS PENSION

Time-Weighted Rates of Return

Periods Ending June 30, 2021

	% of Portfolio 6/30/21	Ten Years ¹		Seven Years ¹		Five Years ¹		Three Years ¹		One Year		Current Quarter	
		Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
TOTAL PLAN	100.0	10.4	10	10.1	5	12.8	10	12.9	14	33.4	8	7.8	4
Median - Greater than \$10 Billion ²		9.2		8.7		11.1		11.4		27.3		6.3	
MPERS Total Plan Policy		10.2		9.9		12.0		12.2		26.4		4.9	
DOMESTIC EQUITIES	23.6	14.7	16	13.9	13	18.1	11	18.1	11	47.3	11	8.7	8
Median ²		12.1		10.9		16.0		16.2		41.5		7.5	
S&P 1500 Index		14.6		13.8		17.4		18.1		42.1		8.1	
PRIVATE EQUITY AND VENTURE CAPITAL	22.1	15.5	8	15.8	13	18.8	10	20.7	5	54.7	4	15.9	14
Median ²		10.6		9.9		10.9		9.6		32.6		8.8	
Private Equity and VC Benchmark ³		17.3		17.0		19.7		20.2		60.9		7.0	
INTERNATIONAL EQUITIES	17.1	7.0	32	7.0	32	12.6	29	11.1	36	40.3	22	6.3	24
Median ²		6.6		6.1		11.5		10.4		38.6		5.8	
International Blended Benchmark ⁴		5.6		5.3		11.1		9.4		35.7		5.5	
REAL RETURN AND OPPORTUNISTIC	12.6	11.7		11.9		14.6		15.0		35.7		5.6	
50% (CPI + 4%) + 50% (6.8% actuarial rate) ⁵		7.2		7.1		7.2		6.9		8.3		2.6	
FIXED INCOME	10.2	4.4	38	4.4	21	4.5	32	5.7	59	5.4	17	2.3	44
Median ²		4.1		3.8		3.9		5.8		0.8		2.3	
Barclays Aggregate		3.4		3.3		3.0		5.3		-0.3		1.8	
REAL ESTATE & INFRASTRUCTURE	6.8	9.0	55	8.0	47	6.1	53	3.5	69	5.4	52	3.7	39
Median ²		9.1		7.8		6.2		5.4		5.5		2.9	
NCREIF - Property Blended Index ⁶		7.4		6.3		4.8		4.2		6.0		3.3	
NCREIF Open Fund Index Net		8.6		7.4		5.6		4.6		7.1		3.7	
ABSOLUTE RETURN	5.1	5.5		5.1		6.9		6.9		19.1		5.0	
HFRI FOF Cons 1 month lagged		3.4		3.5		4.9		5.2		16.6		2.6	
CASH EQUIVALENTS	2.5	1.0		1.2		1.5		1.6		0.3		0.1	
1 Month T-Bill		0.6		0.8		1.1		1.2		0.1		0.0	

¹ Annualized Returns and Percentile Rank.

² Comparison universe is the State Street Universe comprised of Public Funds greater than \$10 billion on the total plan level and greater than \$1 billion for asset classes.

³ SP500 + 300 bps with a 3 month lag.

⁴ International blended benchmark is MSCI ACWI ex USA 10/1/10 to present.

⁵ History prior to 12/1/18 reflects 50% (CPI +5%) + 50% (actuarial rate).

⁶ NCREIF - Property Blended Index is NPI minus 130 bps.

Source: State Street Analytics; the NCREIF - NPI (Property Index) source is NCREIF.

Cumulative and Consecutive Total Fund Returns

MPSERS

Cumulative For Years Ending 6/30/21

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MPSERS	33.4	15.5	12.9	12.7	12.8	10.8	10.1	11.2	11.3	10.4
Public Plan - Median (> \$10 billion)*	27.3	14.3	11.4	10.7	11.1	9.3	8.7	9.7	10.1	9.2
Rank	8	13	14	10	10	15	5	5	11	10
bp Difference - Median	606	125	158	203	161	150	149	151	122	120

Consecutive For Years Ending

	06/21	06/20	06/19	06/18	06/17	06/16	06/15	06/14	06/13	06/12
MPSERS	33.4	0.1	8.0	12.0	12.9	1.5	6.2	19.1	12.2	2.6
Public Plan - Median (> \$10 billion)*	27.3	2.3	6.6	9.1	13.0	1.0	3.5	17.1	12.6	1.1
Rank	8	89	19	4	56	44	5	11	60	28
bp Difference - Median	606	-218	133	289	-10	50	274	209	-39	150

MSERS

Cumulative For Years Ending 6/30/2021

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MSERS	33.4	15.5	13.0	12.7	12.8	10.8	10.1	11.2	11.3	10.4
Public Plan - Median (> \$1 billion)*	27.3	14.3	11.7	10.8	11.1	9.3	8.8	9.7	9.9	9.1
Rank	6	17	18	15	15	19	11	12	15	15
bp Difference - Median	609	122	128	197	164	148	134	151	140	130

Consecutive For Years Ending

	06/21	06/20	06/19	06/18	06/17	06/16	06/15	06/14	06/13	06/12
MSERS	33.4	0.1	7.9	12.0	13.0	1.5	6.2	19.1	12.2	2.4
Public Plan - Median (> \$1 billion)*	27.3	2.6	6.5	9.1	12.9	1.0	3.4	16.9	12.5	1.0
Rank	6	89	17	4	48	44	4	12	58	32
bp Difference - Median	609	-252	143	294	4	54	281	216	-31	142

*State Street Public Funds Universe

Cumulative and Consecutive Total Fund Returns

MSPRS

Cumulative For Years Ending 6/30/21

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MSPRS	33.4	15.5	12.9	12.7	12.8	10.8	10.1	11.2	11.3	10.4
Public Plan - Median (> \$1 billion)*	27.3	14.3	11.7	10.8	11.1	9.3	8.8	9.7	9.9	9.1
Rank	6	17	19	16	15	20	12	12	15	15
bp Difference - Median	604	120	126	195	163	147	133	149	137	128

Consecutive For Years Ending

	06/21	06/20	06/19	06/18	06/17	06/16	06/15	06/14	06/13	06/12
MSPRS	33.4	0.1	7.9	12.0	13.0	1.5	6.2	19.0	12.1	2.5
Public Plan - Median (> \$1 billion)*	27.3	2.6	6.5	9.1	12.9	1.0	3.4	16.9	12.5	1.0
Rank	6	88	17	4	48	44	4	12	60	31
bp Difference - Median	604	-251	141	295	3	53	279	208	-42	146

MJRS

Cumulative For Years Ending 6/30/21

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MJRS	32.3	15.1	12.6	12.5	12.6	10.7	10.0	11.0	11.1	10.2
Public Plan - Median (> \$1 billion)*	27.3	14.3	11.7	10.8	11.1	9.3	8.8	9.7	9.9	9.1
Rank	9	29	21	18	19	20	16	16	17	17
bp Difference - Median	492	73	95	172	146	133	121	129	121	112

Consecutive For Years Ending

	06/21	06/20	06/19	06/18	06/17	06/16	06/15	06/14	06/13	06/12
MJRS	32.3	0.1	7.9	12.0	13.0	1.5	6.2	18.2	12.2	2.4
Public Plan - Median (> \$1 billion)*	27.3	2.6	6.5	9.1	12.9	1.0	3.4	16.9	12.5	1.0
Rank	9	88	17	4	47	44	4	26	55	32
bp Difference - Median	492	-250	142	295	10	51	278	128	-26	136

*State Street Public Funds Universe

State of Michigan Retirement System

ASSET ALLOCATION REVIEW

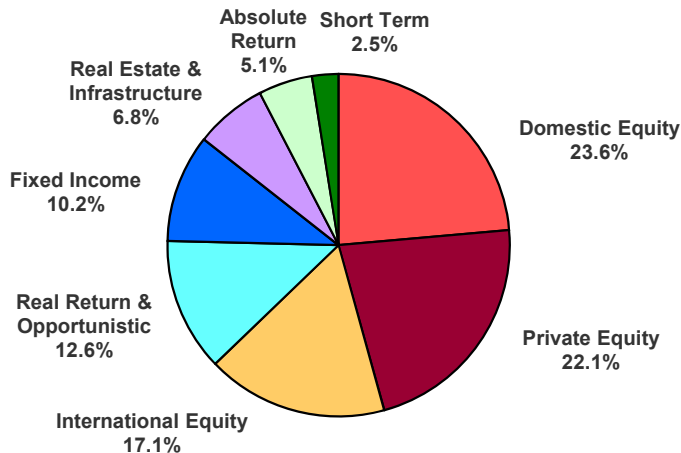
State of Michigan Investment Board Meeting
September 16, 2021



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

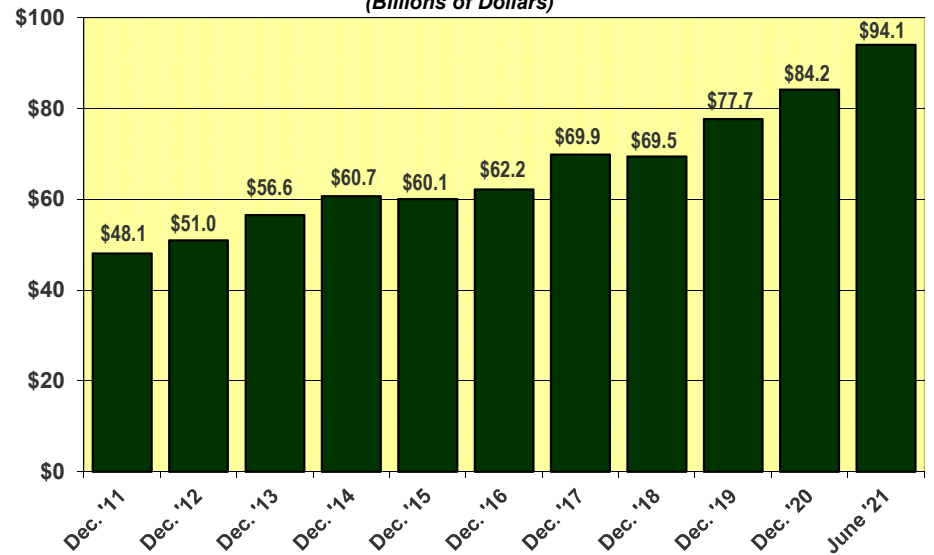
STATE OF MICHIGAN RETIREMENT SYSTEM PROFILE - JUNE 2021

Asset Allocation ~ 6/30/21



Market Value*

(Billions of Dollars)



Asset Allocation By Market Value
(In Millions)

Investment Strategies	6/30/2021		6/30/2020	
Domestic Equity	\$22,169	23.6%	\$15,080	20.9%
Private Equity	20,826	22.1%	13,779	19.1%
International Equity	16,043	17.1%	11,458	15.9%
Real Return & Opportunistic	11,880	12.6%	8,884	12.3%
Fixed Income	9,616	10.2%	9,163	12.7%
Real Estate & Infrastructure	6,373	6.8%	6,295	8.7%
Absolute Return	4,810	5.1%	4,179	5.8%
Short Term***	2,361	2.5%	3,363	4.6%
TOTAL	\$94,078	100.0%	\$72,201	100.0%

Market Value By Plan ~ 6/30/21

(in Millions)

	Pension Plan Mkt. Value	OPEB** Mkt. Value	Combined Mkt. Value	%
MPSERS	\$62,434	\$10,129	\$72,563	77.1%
MSERS - (closed)	14,385	4,660	19,045	20.3%
MSPRS	1,811	348	2,159	2.3%
MJRS - (closed)	300	11	311	0.3%
TOTAL	\$78,930	\$15,148	\$94,078	100.0%

MSERS includes the Military Pension Fund

Short Term Equivalents (in Billions)

Short Term Strategy***	\$2.4	
Short Term in Other Inv. Strategies	2.5	
TOTAL SHORT TERM	\$4.9	5.2% of Total Funds

15th Largest State Public Retirement System in the U.S.

Pensions & Investments survey - February 8, 2021 issue

*The combined net payout for the plans for FY 2020 was \$1.6 billion with \$22.9 billion paid out FY 2010 thru FY 2020 (Pension CAFRs). This represents the amount paid to beneficiaries in excess of employer and employee contributions.

**OPEB - Other Post Employment Benefits

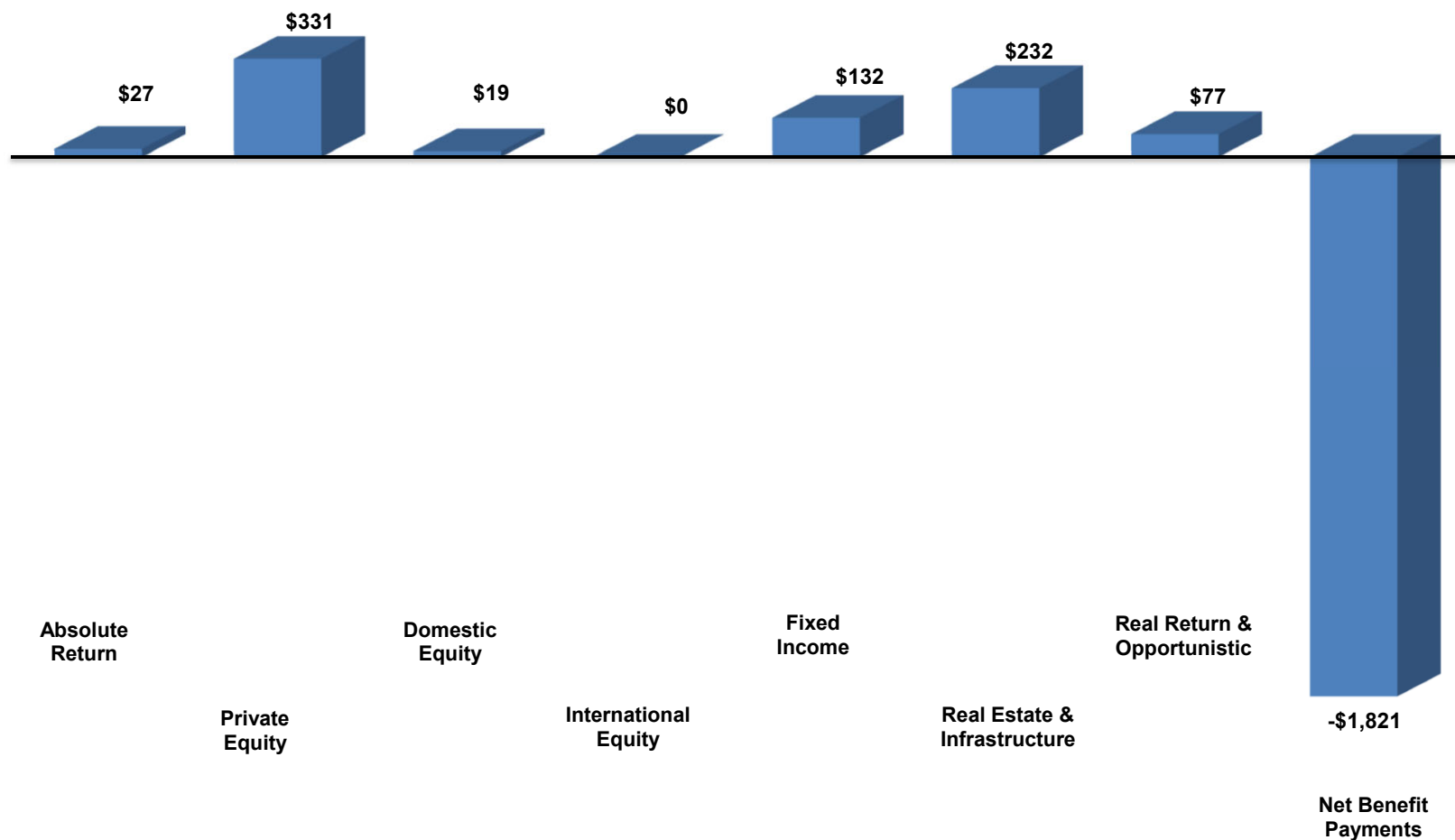
Sources and Uses of Cash

July 2020 ~ June 2021

7/01/20 Short-Term Cash Balance: \$ 3,365

6/30/21 Short-Term Cash Balance: 2,362

Net Short-Term Cash Decrease: \$1,003



A negative number in an asset category indicates a use of cash, a positive number indicates a source of cash.

Dollars in millions

Asset Allocation Targets

As of 6/30/21

	MPSERS		MSERS		MSPRS		MJRS		SMRS
Asset Class	6/30/21	Target*	6/30/21	Target*	6/30/21	Target*	6/30/21	Target*	Ranges
Domestic Equity	23.6%	25.0%	23.6%	25.0%	23.6%	25.0%	23.7%	25.0%	17% - 32%
Private Equity	22.1%	16.0%	22.2%	16.0%	22.2%	16.0%	22.3%	16.0%	13% - 25%
International Equity	17.1%	15.0%	17.1%	15.0%	17.1%	15.0%	17.1%	15.0%	12% - 22%
Real Return & Opportunistic	12.6%	12.5%	12.7%	12.5%	12.7%	12.5%	12.7%	12.5%	8% - 18%
Long Term Fixed Income	10.2%	10.5%	10.3%	10.5%	10.2%	10.5%	10.3%	10.5%	8% - 18%
Real Estate & Infrastructure	6.8%	10.0%	6.8%	10.0%	6.8%	10.0%	6.8%	10.0%	8% - 18%
Absolute Return	5.1%	9.0%	5.1%	9.0%	5.1%	9.0%	5.2%	9.0%	5% - 11%
Short Term Fixed Income	2.5%	2.0%	2.2%	2.0%	2.3%	2.0%	1.9%	2.0%	1% - 8%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

*Complies with basket clause and international restrictions.

State of Michigan Retirement System

MARKETS REVIEW AND OUTLOOK

State of Michigan Investment Board Meeting

September 16, 2021



Gregory J. Parker, CFA

Director of Investments – Public Markets

Director of Asset Allocation

Bureau of Investments

CAPITAL MARKETS

Return and Risk Assumptions, Benchmark and Outlook

A starting point.

MPSERS Plan	Assumed Return* (Arithmetic)	Standard Deviation*	Trailing 10-Year (Benchmark**)
Private Equity	10.9%	25.0%	16.9%
International Equity	8.9%	21.5%	5.6%
Real Ret/Opportunistic	8.0%	9.5%	7.2%
Domestic Equity	7.3%	18.2%	14.6%
Real Estate (Core)	7.5%	15.0%	7.4%
Absolute Return	4.9%	9.0%	3.1%
Long-Term Fixed Income	2.0%	4.0%	3.4%
Short-Term	1.7%	1.5%	0.6%

* Aon Investment Consultants 2021 Long-Term Return/Risk Assumptions

** Investment Policy Statement; Annualized Returns

*** Actual investments may differ due to changing conditions and the availability of new information

Overview

A market update.

- Capital market assumptions used for determining strategic asset allocations are being reduced across the board, and especially for safer, publicly traded fixed income securities. This is the general opinion for most consultants, investment banks, and other market participants. The reason for this phenomenon is the low interest rate environment caused by the policies of the Federal Reserve (Fed) and other central banks, as well as the run-up in prices for most risk assets over the past several years.
- Fundamentally, the market's returns on equity continue to be historically higher than average and some of the largest companies in the market today are less cyclical (economically sensitive) than past market leaders. These facts lend support to the argument that higher valuations are justified, and therefore the market could perhaps continue to deliver historical average rates of return in the future
- Commodities prices broadly, as measured by the CRB index, are up sharply at 55% over the 12-month period ending June 2021. Many economists maintain the viewpoint that these prices reflect some short-term supply and demand imbalances. Alternative viewpoints suggest that the Federal Reserve's monetary policies, and the U.S. government's fiscal policies have created structural imbalances and will cause longer-term inflation to be higher than normal.
- At the end of June 2021, the 10-year U.S. Treasury rate was at 1.47%. A 10-year U.S. Treasury rate of 2.0 – 2.5% would be at the top end of the trading range for longer rates going back to the 1980's.
- Dividend yields on REITs at the end of June 2021 were estimated to be around 2.6%, which is nearly 1.4% higher than the yield of the 10-year U.S. Treasury. This is at the historical metric and may be seen as fairly attractive.

U.S. Fixed Income

Tough valuations in Fixed Income.

- Longer term interest rates have been rising over the past year, however short-term rates (1 year maturity and in) continued to fall. Because of this, the U.S. Treasury rate curve is slightly steeper than average.
- Interest rates at both the long and short end are earning less than the year-over-year increase in CPI. In fact, going back to the mid 1950's, the Fed Funds rate relative to the Year over Year change in CPI has never been lower.
- Both investment grade and high yield spreads have tightened considerably. Today spreads are at their tightest levels since the early months of 2007.
- It would seem that rates have some upward pressure due to a healing economy and inflation rates higher than nominal rates. This potentially places some stronger headwinds on bond returns. However, as long as the Federal Reserve's policy rate remains at these levels, the shape of the yield curve could put a lid of sorts on the longer dated rates.
- At the end of June 2021, the 10-year U.S. Treasury rate was at 1.47%. A 10-year U.S. Treasury rate of 2.0 – 2.5% would be at the top end of the trading range for longer rates going back to the 1980's.

Domestic Equity

Another good quarter for risk assets.

- The broad U.S. stock market return for the one year ending June 2021 was 42.1%.
- Many domestic equity valuation metrics are above historical averages, and analysts expect that fundamentals will continue to deteriorate over the next twelve months. Consequently, the returns over the next cycle may not be as strong as the historical average of 11 – 12% year-over-year total returns.
- Fundamentally, the market's returns on equity continue to be historically higher than average and some of the largest companies in the market today are less cyclical (economically sensitive) than past market leaders. These facts lend support to the argument that higher valuations are justified, and therefore the market could perhaps continue to deliver historical average rates of return in the future.
- The year ending June 2021 was great for risk assets. The small cap Russell 2000 outperformed the larger cap S&P 500 by 21.2%. The value style also had a good year relative to the growth style, outperforming by 2.3%. However, over longer time periods, value and small caps have underperformed.

International Equity

Trailing U.S. equities.

- International equities underperformed domestic equities for the year ending June 2021 by -6.4%. Over the past three, five, seven, and ten years, the international market index, MSCI ACWI ex USA, underperformed the S&P 1500 index by -8.7%, -6.3%, -8.5%, and -9.2% annualized, respectively.
- Within international equities, emerging market returns exceeded developed markets over the past one, three, five and seven years by 7.3%, 2.7%, 2.7% and 1.5% annualized, respectively. However, over the past ten years, emerging markets returns were -1.4% annualized less than developed markets.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international markets trade at approximately a 30% discount to U.S. counterparts while emerging markets are at a 33% discount.

Real Estate

Comparing public vs. private real estate.

- Over the one year ending June 2021, the NAREIT index increased by 32.8% including dividends which was 25.4% higher than their private market counterparts. Over the medium to longer-term, publicly traded REITs have earned 0.5% - 1.5% higher return than their private market counterparts but they are about three times more volatile.
- Dividend yields on REITs at the end of June 2021 were estimated to be around 2.6%, which is nearly 1.4% higher than the yield of the 10-year U.S. Treasury. This is at the historical metric and may be seen as fairly attractive.

Hedge Funds

Estimating the asset class return.

- Over the past five years, the Absolute Return portfolio's return has had a monthly beta of approximately 0.2 and annualized alpha of 2.1%.
- Based on an expected annualized equity market return of approximately 7.3%, should historical hedge fund betas and alphas continue, a 3.6% annualized net return seems like a reasonable assumed rate of return for hedge funds. This return is approximately 3-month U.S. Libor plus 350 basis points. However, it should also be noted that in the past after times of market dislocations, the realized alpha has been higher.

Commodities





Inflation; transitory or something else?





- As the economic recovery has gained momentum, and Fed policy remains ultra-accommodative, the attention has turned towards inflation. The U.S. dollar has fallen in value over the past year ending June 2021 by -5.1% as measured by the DXY index, though it is near the midpoint of the past 5 year's trading range.
- The commodities prices broadly, as measured by the CRB index, are up sharply at 55% over the 12-month period ending June 2021. Many economists maintain the viewpoint that these prices reflect some short-term supply and demand imbalances. Alternative viewpoints suggest that the Federal Reserve's monetary policies, and the U.S. government's fiscal policies have created structural imbalances and will cause longer-term inflation to be higher than normal.

Annual Total Returns of Key Asset Classes 2001 - 2020

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Best ↑	Corp. Bonds	Gov't Bonds	Int'l Equity	Int'l Equity	Real Estate	Int'l Equity	Int'l Equity	Gov't Bonds	Int'l Equity	U.S. Equity	Real Estate	Int'l Equity	U.S. Equity	U.S. Equity	Real Estate	U.S. Equity	Int'l Equity	Real Estate	U.S. Equity	U.S. Equity	Best ↑
	10.40%	11.50%	40.82%	20.90%	20.06%	26.65%	16.65%	12.38%	41.44%	16.38%	14.26%	16.83%	32.80%	13.08%	13.32%	11.93%	27.19%	6.71%	30.90%	17.92%	
	Real Estate	Corp. Bonds	U.S. Equity	Real Estate	Int'l Equity	Real Estate	Real Estate	Cash	U.S. Equity	Real Estate	Gov't Bonds	U.S. Equity	Int'l Equity	Real Estate	U.S. Equity	Real Estate	U.S. Equity	Inflation	Int'l Equity	Int'l Equity	
	7.28%	10.52%	29.58%	14.48%	16.62%	16.59%	15.84%	2.05%	27.24%	13.11%	9.02%	16.17%	15.29%	11.81%	1.01%	7.97%	21.13%	1.91%	22.13%	10.65%	
	Gov't Bonds	Real Estate	Hedge Funds	U.S. Equity	U.S. Equity	U.S. Equity	Gov't Bonds	Inflation	Corp. Bonds	Int'l Equity	Corp. Bonds	Real Estate	Real Estate	Corp. Bonds	Gov't Bonds	Corp. Bonds	Real Estate	Cash	Corp. Bonds	Corp. Bonds	
	7.24%	6.74%	9.01%	11.78%	5.65%	15.34%	8.67%	0.10%	16.05%	11.15%	8.35%	10.54%	10.99%	7.53%	0.86%	5.63%	6.96%	1.88%	14.54%	9.89%	
	Cash	Hedge Funds	Real Estate	Hedge Funds	Hedge Funds	Hedge Funds	Hedge Funds	Corp. Bonds	Hedge Funds	Corp. Bonds	Inflation	Corp. Bonds	Hedge Funds	Gov't Bonds	Inflation	Int'l Equity	Corp. Bonds	Gov't Bonds	Gov't Bonds	Gov't Bonds	
	4.43%	3.57%	8.99%	5.83%	5.13%	9.21%	7.68%	-3.07%	9.65%	8.46%	2.96%	9.37%	7.70%	4.92%	0.66%	4.50%	6.42%	0.88%	6.83%	7.94%	
	Hedge Funds	Inflation	Corp. Bonds	Corp. Bonds	Inflation	Cash	U.S. Equity	Real Estate	Inflation	Gov't Bonds	U.S. Equity	Hedge Funds	Inflation	Hedge Funds	Hedge Funds	Inflation	Hedge Funds	Hedge Funds	Real Estate	Hedge Funds	
	3.11%	2.39%	7.69%	5.25%	3.42%	4.81%	5.47%	-6.46%	2.72%	5.52%	1.75%	4.22%	1.49%	3.14%	0.37%	2.09%	3.88%	-1.05%	6.42%	4.75%	
Worst ↓	Inflation	Cash	Gov't Bonds	Gov't Bonds	Cash	Corp. Bonds	Corp. Bonds	Hedge Funds	Cash	Hedge Funds	Cash	Gov't Bonds	Cash	Inflation	Cash	Hedge Funds	Gov't Bonds	Corp. Bonds	Hedge Funds	Real Estate	
	1.55%	1.79%	2.36%	3.48%	3.06%	4.27%	5.10%	-19.86%	0.19%	5.07%	0.10%	2.02%	0.07%	0.68%	0.01%	1.89%	2.30%	-2.51%	4.40%	1.60%	
	U.S. Equity	Int'l Equity	Inflation	Inflation	Gov't Bonds	Gov't Bonds	Cash	U.S. Equity	Gov't Bonds	Inflation	Hedge Funds	Inflation	Corp. Bonds	Cash	Corp. Bonds	Gov't Bonds	Inflation	U.S. Equity	Inflation	Inflation	
	-10.64%	-14.95%	1.88%	3.25%	2.65%	3.46%	5.03%	-36.72%	-2.19%	1.50%	-3.55%	1.70%	-2.01%	0.04%	-0.77%	1.05%	2.12%	-4.96%	2.29%	1.40%	
	Int'l Equity	U.S. Equity	Cash	Cash	Corp. Bonds	Inflation	Inflation	Int'l Equity	Real Estate	Cash	Int'l Equity	Cash	Gov't Bonds	Int'l Equity	Int'l Equity	Cash	Cash	Int'l Equity	Cash	Cash	
	-19.74%	-21.30%	1.16%	1.33%	1.95%	2.55%	4.06%	-45.52%	-16.86%	0.13%	-13.71%	0.11%	-2.60%	-3.87%	-5.67%	0.27%	0.84%	-14.20%	2.28%	0.45%	

Annualized Returns 2001 - 2020																				
Return		Cash		Infl.		Hedge		Gov't		Int'l		Corp.		US Eq.		R.E.				Return
Risk		1.50%		2.04%		3.19%		4.34%		5.69%		6.10%		7.71%		8.19%				Risk
		0.83%		1.34%		5.28%		4.61%		19.88%		5.60%		17.32%		4.61%				

 - Hedge Funds are represented by the HFRI FOF Conservative Index
 - Inflation is represented by the U.S. Consumer Price Index (SA)
 - International Equity is represented by the MSCI - AC World EX-USA Index
 - Cash is represented by 30-day T-Bills

 - U.S. Equity is represented by the S&P 1500 Index
 - Real Estate is represented by the NCREIF National Property Index
 - Corporate Bonds are represented by the BBG Barclays - U.S. Corp. Inv. Gd. Index
 - Government Bonds are represented by the BBG Barclays - U.S. Government Index

State of Michigan Retirement System

PRIVATE EQUITY REVIEW

State of Michigan Investment Board Meeting
September 16, 2021



Peter A. Woodford
Senior Investment Manager
Private Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	54.7%	20.7%	18.8%	15.8%	15.5%
PE Benchmark Returns	60.9%	20.2%	19.7%	17.0%	17.3%
Peer Median Returns	32.6%	9.6%	10.9%	9.9%	10.6%
Percentile Rank vs. Peers*	4	5	10	13	8

*State Street Universe greater than \$1 billion

- Private Equity returns have been strong relative to peer returns, ranking in the top 8% of peers over the past ten years. Outperformance to peers is attributable to strategy as well as fund and co-investment selectivity.
- It is not unusual for private equity returns to lag the public benchmark returns during periods of expansion and lead the public benchmark during periods of contraction. However, over the past ten years (largely an expansionary period) the Private Equity Division has slightly outperformed the S&P (ten-year S&P 500 return 14.8%) by 70 bps while underperforming the PE benchmark by 1.8%.
- For the twelve months ending June 30, 2021, the Private Equity and Venture Capital Divisions received distributions of approximately \$331 million, net of contributions. This is the first time in the past three years that last 12-month (“LTM”) net cash flows were positive and represents the highest level since the 6/30/17 LTM period. Specific to distributions, General Partners continue to take advantage of a favorable monetization environment as LTM distributions are at a 10-year high and nearly double that of the 6/30/20 LTM period.
- Commitments closed during the quarter include:
 - \$150 million to Insight Partners XII, a global growth equity fund.
 - \$125 million to KKR North American Fund XIII, a large-cap buyout fund.
 - \$100 million to Apax Digital II, a U.S. and Europe focused growth equity fund.
 - \$100 million to Genstar Capital Partners X, a U.S. focused middle-market buyout fund.
 - \$100 million to Hellman & Friedman Capital Partners X, a global mega-cap buyout fund.
 - \$60 million to Veritas Capital Vantage Fund, a U.S. focused middle-market buyout fund.
 - \$25 million to Accel Growth Fund VI, a global growth-stage venture capital fund.
 - \$25 million to Genstar X Opportunities Fund I, a priority co-investment vehicle.
 - \$25 million to TI Platform Fund III, a seed-stage venture capital fund-of-funds.
 - \$15 million to Meritech Capital Partners Franchise Fund, a late-stage venture capital fund.
 - \$12.5 million to Accel London VII, an early-stage Europe focused venture capital fund.
 - \$10 million to Accel XV, an early-stage U.S. focused venture capital fund.

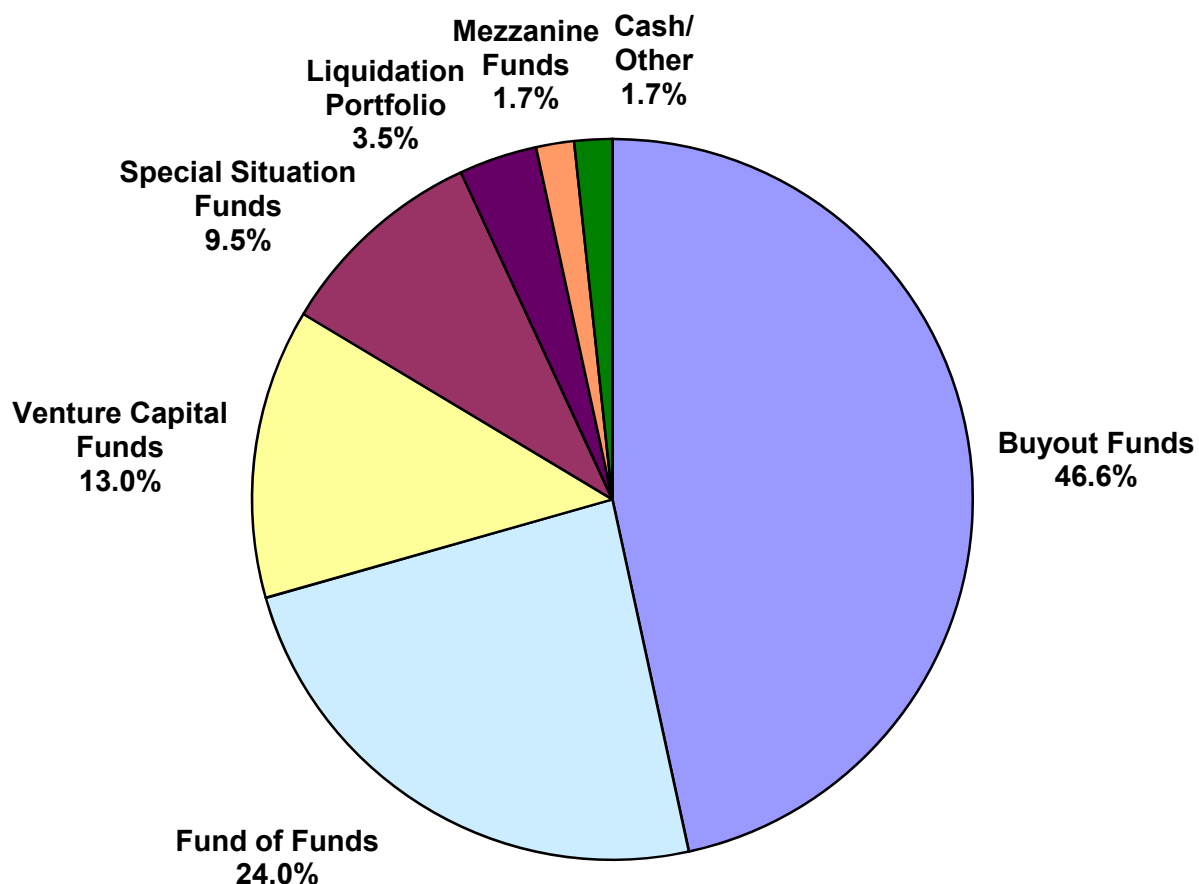
Strategy Update

The strategy for the next twelve months will focus on new sponsors raising capital and existing sponsors raising successor funds. This may be a combination of buyout, venture capital, secondary, and growth equity funds seeking new commitments. The Venture Capital Division will continue to pursue attractive opportunities across all strategies with an increased focus on later-stage funds with a continued bias towards healthcare versus the broader market. Co-investments continue to play an important role in both averaging down costs and targeting specific investments with attractive risk/return characteristics.

SMRS

Private Equity

6/30/21



Market Value in Millions				
	6/30/21		6/30/20	
Buyout Funds	\$9,699	46.6%	\$6,283	45.6%
Fund of Funds	5,005	24.0%	2,870	20.8%
Venture Capital Funds	2,703	13.0%	1,480	10.8%
Special Situation Funds	1,977	9.5%	1,752	12.7%
Liquidation Portfolio	732	3.5%	828	6.0%
Mezzanine Funds	345	1.7%	300	2.2%
Cash/Other	365	1.7%	266	1.9%
Total	\$20,826	100.0%	\$13,779	100.0%

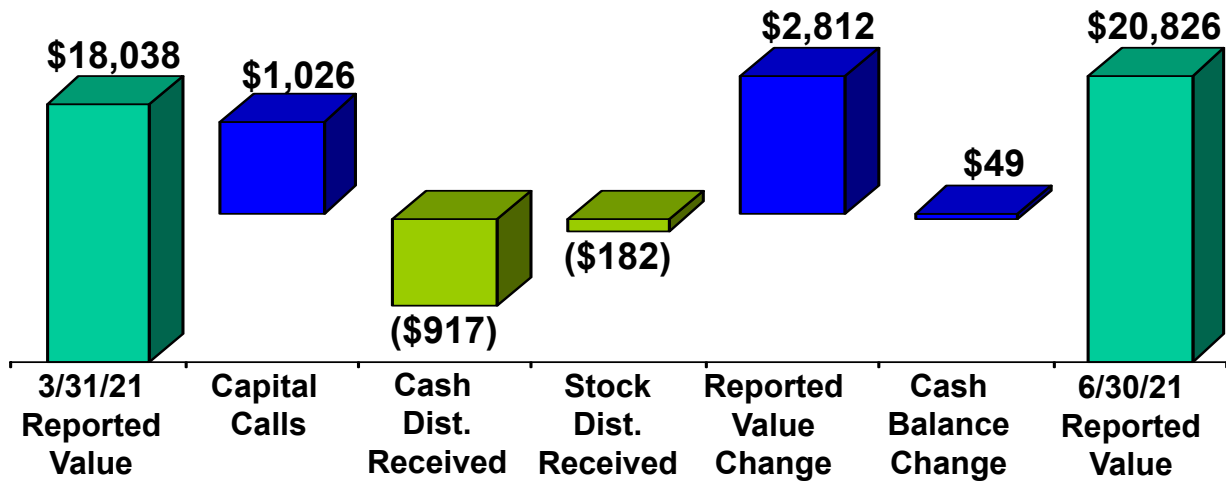
SMRS

Private Equity

6/30/21

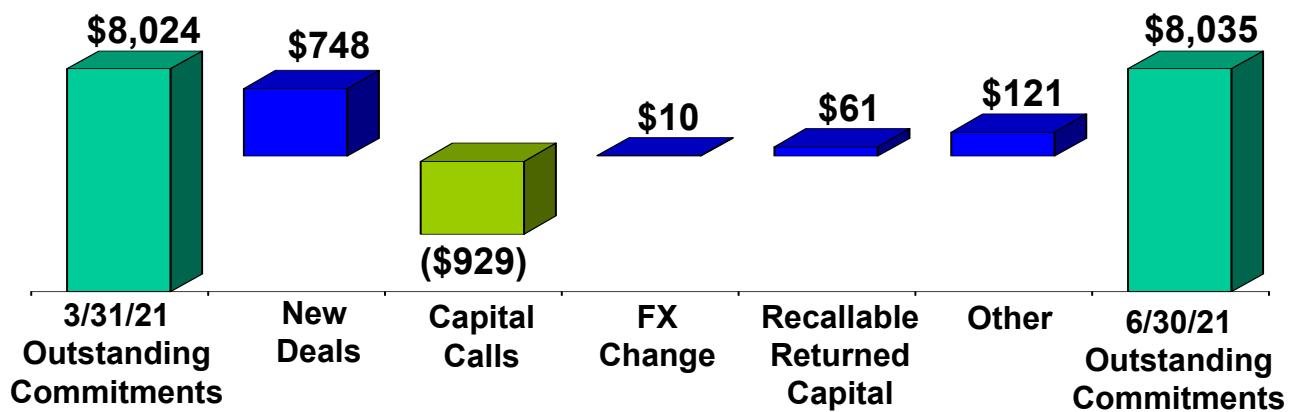
Invested Commitments

(\$ in Millions)



Outstanding Commitments

(\$ in Millions)

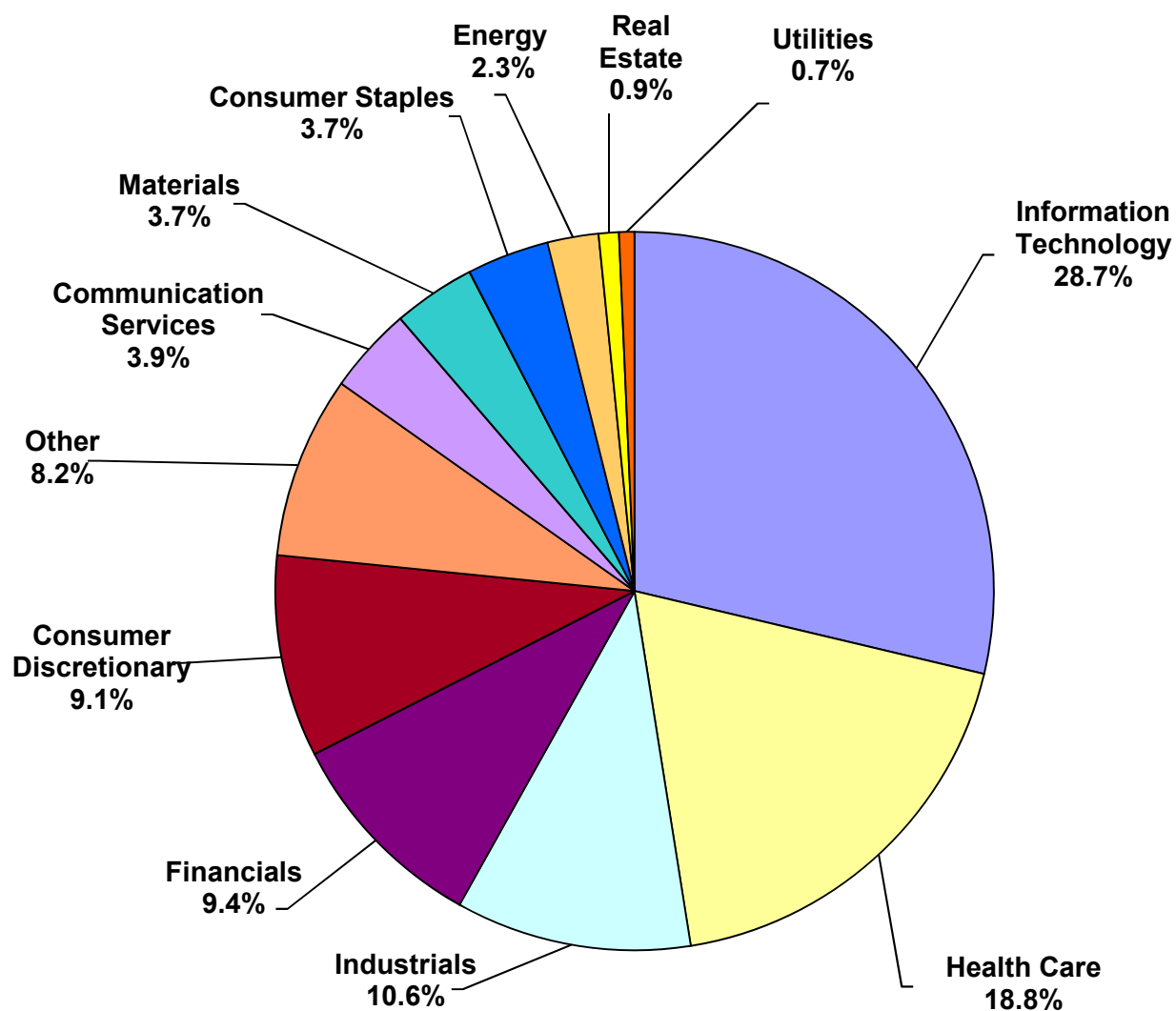


SMRS

Private Equity

6/30/21

Investments by Industry



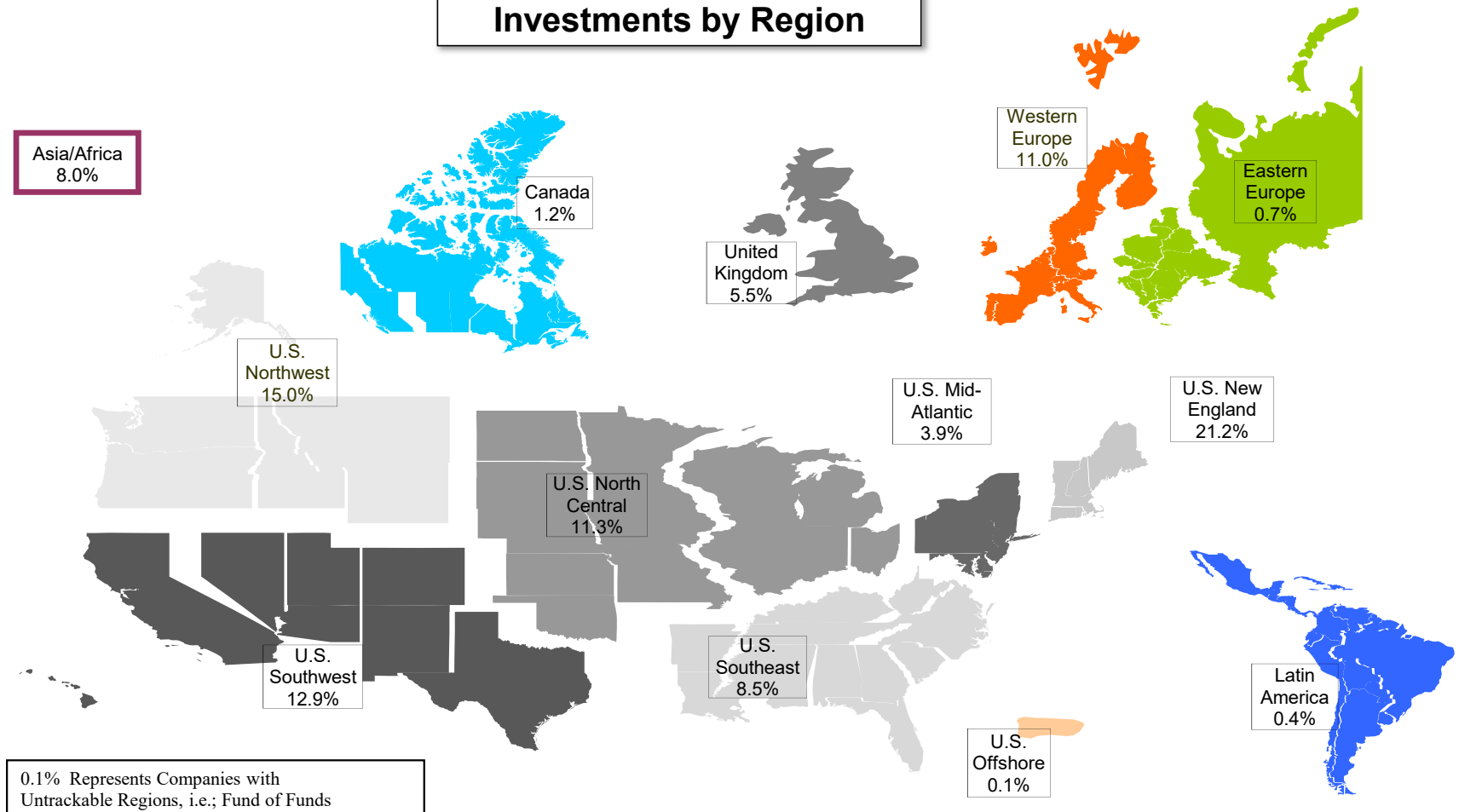
These numbers are based on the most recent available General Partner Data; primarily 3/31/21 and are subject to change.

SMRS

Private Equity

6/30/21

Investments by Region



Geographic Report: North America 74%, Europe 17%, Asia 8%, Other 1%

SMRS

Private Equity

6/30/21

Portfolio by Vintage Year

(\$ in Millions)

Asset Vintage	Reported Value	Outstanding Commitment	Total Exposure
1986-2005	\$ 441	\$ 97	\$ 538
2006*	224	109	333
2007	125	103	228
2008	324	74	398
2009	60	1	61
2010	247	4	251
2011	669	92	761
2012	1,200	64	1,264
2013	284	76	360
2014	1,694	217	1,911
2015	6,822	616	7,438
2016	2,876	399	3,275
2017	1,488	600	2,088
2018	2,385	1,538	3,923
2019	1,097	1,453	2,550
2020	464	925	1,389
2021	60	1,667	1,727
Income Accruals	1	0	1
Cash	345	0	345
Act. Small Cap - Stock Dist	20	0	20
Total	\$ 20,826	\$ 8,035	\$ 28,861

*Liquidation portfolio is 2006 vintage

FX Exposure

(\$ in Millions)

	Reported Value	Outstanding Commitment	Total Exposure	Total (USD)
Euro (\$1.19/ €)	€ 548	€ 339	€ 887	\$1,052

SMRS

Private Equity

6/30/21

Top 10 Sponsors

(\$ in Millions)

Asset Type	Reported Value	Outstanding Commitment	Total
HarbourVest Partners	\$ 5,148	\$ 832	\$ 5,980
KKR	791	287	1,078
Insight Venture Partners	729	223	952
Advent International	706	239	945
Leonard Green & Partners	545	331	876
The Carlyle Group	552	279	831
Warburg Pincus	671	143	814
Blackstone Private Equity	553	249	802
Thoma Bravo	539	148	687
Apax Partners	388	281	669
Top 10 Total Value	\$ 10,622	\$ 3,012	\$ 13,634

Cash Weighted Rates of Return*

(Net IRR)	Current Qtr.	1-Year	3-Year	5-Year	10-Year
Buyout	0.2%	40.0%	19.7%	20.1%	15.4%
Fund of Funds	0.0%	41.7%	21.0%	20.3%	16.8%
Mezzanine	0.0%	16.2%	10.4%	11.7%	11.1%
Special Situations	0.0%	32.3%	12.7%	13.6%	11.7%
Venture Capital	-0.4%	68.9%	30.7%	27.7%	20.6%

*These numbers are based on most recent available General Partner reported data; primarily 3/31/21 and are subject to change.

SMRS

Private Equity

6/30/21

Net Market Values by Ownership Entity

	Adjusted Reported Value	Unfunded Commitment
5AM Opportunities I, L.P.	\$ 29,981,614	\$ 7,725,000
5AM Opportunities II, L.P.	2,000,000	23,000,000
5AM Ventures VI, L.P.	21,790,068	7,800,000
5AM Ventures VII, L.P.	0	25,000,000
Accel Europe I, L.P.	1,458,323	1
Accel Europe II, L.P.	23,665,192	3,300,000
Accel Growth Fund II, L.P.	14,349,489	0
Accel Growth Fund III, L.P.	12,464,832	280,000
Accel Growth Fund IV, L.P.	33,605,858	990,000
Accel Growth Fund V, L.P.	28,574,102	3,278,554
** Accel Growth Fund VI, L.P.	3,125,000	21,875,000
Accel IX, L.P.	1,562,347	4,522,725
Accel Leaders Fund 3, L.P.	10,400,000	29,600,000
Accel Leaders Fund II, L.P.	11,520,275	0
Accel Leaders Fund, L.P.	18,927,879	0
Accel London V, L.P.	55,887,415	1,320,000
Accel London VI, L.P.	11,269,174	4,375,000
** Accel London VII, L.P.	0	12,500,000
Accel VI-S	1,938,726	652,611
Accel VI, L.P.	757,891	0
Accel X, L.P.	5,590,535	0
Accel XI, L.P.	6,695,387	1,440,000
Accel XII, L.P.	13,631,679	980,000
Accel XIII, L.P.	11,860,634	1,900,000
Accel XIV L.P.	8,663,509	2,650,000
** Accel XV, L.P.	1,000,000	9,000,000
Acorn Bioventures, L.P.	78,040,069	35,000,000
Advent Global Private Equity V, L.P.	5,094,831	8,700,000
Advent International GPE IX, L.P.	153,708,140	144,344,818
Advent International GPE VI-A, LP	19,942,991	0
Advent International GPE VII-B, L.P.	127,814,767	12,000,000
Advent International GPE VIII-B, L.P.	369,294,223	11,474,998
Advent International LAPEF VII, L.P.	900,000	59,100,000
Advent Latin American Private Equity Fund VI, L.P.	29,205,854	2,975,000
Affinity Asia Pacific Fund III, L.P.	9,256,249	8,520,204
Affinity Asia Pacific Fund IV, L.P.	70,822,608	17,590,077

	Adjusted Reported Value	Unfunded Commitment
Affinity Asia Pacific Fund V L.P.	42,266,822	140,620,493
AIP VII, L.P.	31,862,646	40,309,886
** Apax Digital II, L.P.	0	100,000,000
Apax Digital, L.P.	40,025,030	27,025,771
Apax Europe Fund VI, L.P.	21,244,289	2,507,939
Apax Europe VII, L.P.	1,548,922	1,766,257
Apax IX, L.P.	239,224,497	16,028,952
Apax US VII, L.P.	2,583,555	417,509
Apax VIII - B, L.P.	49,114,146	5,890,984
Apax X USD, L.P.	34,363,936	127,395,000
Apollo Investment Fund IX, L.P.	51,581,187	54,933,299
Apollo Investment Fund VIII, L.P.	64,968,632	13,386,911
Arboretum Ventures II, L.P.	967,091	0
Arboretum Ventures III, L.P.	7,133,618	0
Arboretum Ventures IV, L.P.	37,083,773	6,810,000
Arboretum Ventures V, L.P.	12,406,006	24,220,000
Ares Corporate Opportunities Fund II	128,520	11,423,773
Ares Corporate Opportunities Fund III, LP	6,658,818	6,656,978
Ares Corporate Opportunities Fund IV, L.P.	57,437,277	13,875,059
ASF VIII B	46,587,846	119,067,222
AXA ASF Miller Co-Investment	341,104	6,656,684
Axiom Asia 6, L.P.	5,750,000	44,250,000
Axiom Asia Co-Investment Fund I, L.P.	46,416,656	10,425,818
Axiom Asia Co-Investment Fund II, L.P.	4,000,000	46,000,000
Axiom Asia IV, L.P.	59,545,590	9,950,886
Axiom Asia Private Capital Fund III, L.P.	104,941,557	5,250,002
Axiom Asia V, L.P.	34,559,443	20,200,000
BC European Capital IX, L.P.	109,197,347	7,586,914
BC European Capital VII, L.P.	753,241	0
BC European Capital VIII, L.P.	4,157,979	9,245,806
Berkshire Fund IX Coinvestment Fund, L.P.	29,276,834	13,288,223
Berkshire Fund IX, L.P.	171,234,471	20,940,573
Berkshire Fund VI, L.P.	22,651,776	7,600,677
Berkshire Fund VII, L.P.	7,165,427	2,805,875
Berkshire Fund VIII, L.P.	117,657,708	4,580,692
Berkshire Fund X, L.P.	0	150,000,000
Blackstone Capital Partners IV, L.P.	2,710,097	4,580,765
Blackstone Capital Partners V, L.P.	6,093,263	13,069,148
Blackstone Capital Partners V-S	1,157,897	712,476
Blackstone Capital Partners VI, LP	186,583,355	32,592,057
Blackstone Capital Partners VII, L.P.	328,561,553	20,557,815
Blackstone Capital Partners VIII L.P.	27,756,421	177,827,614
Bridgepoint Europe IV, L.P.	12,373,322	5,098,532
Carlyle Europe Partners II, L.P.	852,512	1,068,069
Carlyle Europe Partners III, L.P.	11,030,916	1,774,528
Carlyle Europe Partners IV, L.P.	89,140,566	11,487,543

	Adjusted Reported Value	Unfunded Commitment
Carlyle Europe Partners V, S.C.SP.	42,889,614	102,183,878
Carlyle Partners V L.P.	35,909,928	53,227,845
Carlyle Partners VI, L.P.	209,546,745	8,685,035
Carlyle Partners VII, L.P.	162,602,698	100,925,913
Centerbridge Capital Partners III, L.P.	81,869,169	13,403,240
Cerberus SMRS Partners, L.P.	25,620,724	23,304,657
Charlesbank Equity Fund IX, L.P.	75,174,903	15,561,769
Charlesbank Equity Fund X, L.P.	0	100,000,000
Charlesbank Equity Overage Fund X, L.P.	0	50,000,000
Charlesbank Fund IX Overage Allocation Program	46,226,456	1,953,081
CircleUp Credit Fund I, L.P.	21,618,649	4,161,092
CLEARLAKE CAPITAL PARTNERS VI, L.P.	40,560,739	38,613,821
Clearlake Opportunities Partners II, LP	26,564,117	55,939,901
Coller International Partners V, L.P.	6,065,936	2,000,000
Coller International Partners VI, L.P.	28,719,891	29,389,115
Coller International Partners VII, L.P.	102,936,048	44,654,951
Crescent Mezzanine Partners VI, L.P.	11,855,727	5,681,254
Crescent Mezzanine Partners VII, L.P.	89,513,886	55,186,452
CVC Capital Partners VII, L.P.	136,937,693	64,596,844
CVC Capital Partners VIII, L.P.	0	118,590,009
Dover Street IX, L.P.	74,338,799	20,000,000
Dover Street X, L.P.	49,709,467	105,000,000
EnCap Energy Capital Fund X, L.P.	33,108,498	3,475,073
FIMI Opportunity 6, L.P.	51,709,182	8,863,638
FirstMark Capital I, L.P.	80,689,053	196,596
FirstMark Capital IV, L.P.	55,418,475	6,650,000
FirstMark Capital OF I, L.P.	44,653,649	0
FirstMark Capital OF II, L.P.	90,906,915	0
FirstMark Capital OF III, L.P.	27,594,331	12,775,000
FirstMark Capital V, L.P.	9,144,277	25,375,000
Flagship Pioneering Fund VII, LP	10,128,863	188,000,000
Flagship Pioneering Special Opportunities Fund II, L.P.	57,773,161	47,500,000
Flagship Pioneering VI, L.P.	203,326,617	17,250,000
Flagship Ventures Fund 2004	14,068	0
Flagship Ventures Fund 2007, L.P.	5,990,422	0
Flagship Ventures Fund IV, L.P.	189,097,145	0
Flagship Ventures Fund V, L.P.	165,511,883	0
Flagship Ventures Opportunities Fund I, L.P.	58,376,044	2,000,000
Fox Paine Capital Fund II, LP	25,728,142	15,382,699
FS Equity Partners VII, L.P.	85,069,204	11,027,323
FS Equity Partners VIII, L.P.	28,838,982	43,592,912
GCM Grosvenor Fund Investment Program I, L.P.	6,444,551	1,219,800
GCM Grosvenor Fund Investment Program II, L.P.	20,562,475	13,067,284
GCM Grosvenor Fund Investment Program III - 2004	39,344,468	4,405,982
GCM Grosvenor Fund Investment Program III - 2006	41,877,807	6,265,112
GCM Grosvenor Fund Investment Program V, L.P.	46,364,325	8,906,691

	Adjusted Reported Value	Unfunded Commitment
GCM Grosvenor Fund Investment Program VI, L.P.	25,203,397	1,239,237
GCM Grosvenor Fund Investment Program VIII, L.P.	94,499,878	12,769,911
GCM Grosvenor SeasPriFIP L.P. (PIS06-10)	36,710,698	13,899,100
GCM Grosvenor SeasPriFIP L.P. (PIS14)	221,066,469	10,491,753
GCM Grosvenor SeasPriFIP L.P. (Seed)	34,484,363	16,533,172
Genstar Capital Partners IX, L.P.	57,737,708	30,381,379
Genstar Capital Partners VIII, L.P.	66,587,506	4,562,785
** Genstar Capital Partners X, L.P.	0	100,000,000
Genstar IX Opportunities Fund I, L.P.	47,156,871	10,754,522
Genstar VIII Opportunities Fund I, L.P.	61,216,065	2,214,125
** Genstar X Opportunities Fund I, L.P.	0	25,000,000
Golden Bell Azalea, LLC	25,858,787	0
Green Equity Investors V, L.P.	16,918,768	24,920,675
Green Equity Investors VI, L.P.	149,741,727	10,127,675
Green Equity Investors VII, L.P.	263,634,008	57,059,388
Green Equity Investors VIII, L.P.	99,481,398	147,419,016
Greenspring Master G, L.P.	254,544,195	384,000,000
Greenspring Micro II, L.P.	19,675,124	8,466,263
GSO Capital Opportunities Fund II, L.P.	7,969,846	7,875,581
GSO Capital Opportunities Fund III, L.P.	55,537,190	21,633,889
GSO COF III Co-Investment Fund, L.P.	14,280,340	22,658,293
GTCR Fund XIII, L.P.	0	50,000,000
HarbourVest Credit Opportunities Fund II, L.P.	26,052,793	50,250,000
HarbourVest Dover Street VIII, L.P.	21,184,309	5,400,000
HarbourVest Int'l III Partnership, L.P.	152,217	1,200,000
Harbourvest Partners Co-Investment Fund IV L.P.	114,683,775	19,107,835
HarbourVest Partners Co-Investment Fund V L.P.	231,573,299	60,000,000
Harbourvest Partners Co-Investment Fund VI, L.P.	0	200,000,000
HarbourVest Partners Mezzanine Income Fund	70,034,442	16,310,000
HarbourVest V Partnership, L.P.	124,527	300,000
HarbourVest VI - Direct Fund L.P.	1,570,821	750,000
HarbourVest VI Partnership, L.P.	401,460	2,000,000
Harvest Partners VII, L.P.	105,407,688	3,801,792
Harvest Partners VIII, L.P.	67,832,235	35,452,260
** Hellman & Friedman Capital Partners X, L.P.	0	100,000,000
HPS Mezzanine Partners III, L.P.	41,524,370	3,307,462
Insight Partners Fund X Follow-On Fund, L.P.	12,500,002	37,500,000
Insight Partners XI, L.P.	111,781,115	20,500,000
** Insight Venture Partners XII, L.P.	0	150,000,000
Insight Venture Partners GBCF, L.P.	118,877,932	6,664,610
Insight Venture Partners IX, L.P.	278,773,679	6,972,280
Insight Venture Partners X, L.P.	206,551,794	1,051,412
Jade Equity Investors, L.P.	15,425,016	91,257,001
Kelso Investment Associates IX, L.P.	58,901,650	9,256,708
Kelso Investment Associates VII, L.P.	149,220	0
Kelso Investment Associates VIII, L.P.	23,612,714	7,213,751

	Adjusted Reported Value	Unfunded Commitment
Kelso Investment Associates X, L.P.	79,514,971	35,927,408
Khosla Ventures III, L.P.	59,271,065	750,000
Khosla Ventures IV, L.P.	115,943,325	950,000
Khosla Ventures Opportunity I, L.P.	6,675,000	18,325,000
Khosla Ventures Seed D, L.P.	7,879,028	2,720,000
Khosla Ventures Seed E, L.P.	465,000	4,535,000
Khosla Ventures V, L.P.	125,075,492	1,750,000
Khosla Ventures VI, L.P.	66,354,492	16,725,000
Khosla Ventures VII, L.P.	5,300,000	44,700,000
KKR 2006 Fund, L.P.	60,360,308	5,130,166
KKR Americas Fund XII, L.P.	268,799,721	59,858,270
KKR Asian, L.P.	1,027,159	0
KKR Asian Fund II, L.P.	41,296,857	21,990
KKR Asian Fund III, L.P.	103,227,155	30,606,799
KKR China Growth Fund, L.P.	11,714,683	3,383,656
KKR European Fund II, L.P.	1,066,129	0
KKR European Fund III, L.P.	5,205,724	6,430,608
KKR European Fund IV L.P.	117,775,895	330,287
KKR European Fund V (USD) SCSp	82,656,297	50,864,812
KKR Millennium Fund, L.P.	232,956	0
KKR North America Fund XI, L.P.	98,018,809	5,582,229
** KKR North America Fund XIII SCSp	0	125,000,000
Lead Edge Capital IV, L.P.	33,904,861	4,049,876
Lead Edge Capital V, L.P.	16,913,325	13,290,983
Lightspeed Opportunity Fund, L.P.	21,351,290	7,250,000
Lightspeed Venture Partners Select IV, L.P.	12,488,386	13,500,000
Lightspeed Venture Partners VII, L.P.	12,919,267	0
Lightspeed Venture Partners XIII, L.P.	5,109,379	4,900,000
Menlo Special Opportunities Fund II, L.P.	28,526,723	7,515,852
Menlo Ventures IX, L.P.	1,191,017	0
Menlo Ventures X, L.P.	2,852,079	0
Menlo Ventures XI, L.P.	29,372,706	0
Menlo Ventures XIV, L.P.	11,136,382	350,000
Menlo Ventures XV, L.P.	6,023,095	18,750,000
** Meritech Capital Partners Franchise Fund, L.P.	1,237,500	13,762,500
Meritech Capital Partners IV, L.P.	4,957,825	300,000
Meritech Capital Partners V, L.P.	82,159,333	1,450,000
Meritech Capital Partners VI, L.P.	62,563,747	3,506,250
Meritech Capital Partners VII, L.P.	7,910,161	34,106,250
Michigan Growth Capital Partners II, L.P.	175,512,835	1,939,626
Michigan Growth Capital Partners III, L.P.	110,638,978	33,569,695
Michigan Growth Capital Partners, L.P.	24,530,405	7,484,211
Michigan SEMF Barings	16,456,055	133,543,945
Michigan SEMF Grosvenor	11,690,000	138,310,000
New Leaf Biopharma Opportunities II, L.P.	164,268,334	8,000,000
New Leaf Growth Fund I, L.P.	54,588,897	0

	Adjusted Reported Value	Unfunded Commitment
New Leaf Ventures II, L.P.	5,386,547	0
New Leaf Ventures III, L.P.	61,108,153	0
New Leaf Ventures IV, L.P.	51,774,196	18,687,500
Nordic Capital VI, L.P.	215,855	1
Nordic Capital VII, L.P.	8,550	3,316,547
Nordic Capital VIII, L.P. (Alpha)	45,126,802	7,265,067
Oak Investment Partners X, L.P.	197,510	0
Oak Investments Partners IX, L.P.	92,828	0
Oaktree Opportunities Fund X, L.P.	24,452,345	5,100,000
Oaktree Opportunities Fund Xb, L.P.	50,906,317	28,000,000
OCM Opportunities Fund IX, L.P.	49,519,372	0
OCM Opportunities Fund VII (B), L.P.	42,430	2,500,000
OCM Opportunities Fund VII, L.P.	346,094	0
OCM Opportunities Fund VIII B, L.P.	11,985,650	0
OCM Opportunities Fund VIII, L.P.	422,177	0
OCM Principal Opportunities Fund IV, L.P.	50,869	4,996,637
Ocqueoc Holdings, LLC	178,406	48,220,898
Odyssey Investment Partners Fund VI, L.P.	38,864,331	59,721,401
Parthenon Investors II, L.P.	1,036,244	3,186,779
Parthenon Investors III, L.P.	137,644,267	2,656,037
Parthenon Investors IV, L.P.	55,983,461	1,188,794
Peninsula Fund VI, L.P.	27,307,914	3,530,301
Permira Growth Opportunities I, L.P.1	43,534,191	28,122,414
Permira VII L.P. 1	37,707,024	53,792,885
PPC Fund II, L.P.	81,578,197	8,286,334
Public Pension Capital, LLC	62,543,633	40,314,775
Renaissance Venture Capital Fund IV, L.P.	1,557,697	23,250,000
Rhone Partners V, L.P.	136,527,282	11,651,549
Riverside Capital Appreciation Fund VI, L.P.	39,741,753	5,914,751
Riverside Capital Appreciation Fund VII, L.P.	81,384,925	33,438,633
Riverside Micro Cap Fund I, L.P.	16,141,040	5,632,976
Riverside Micro-Cap Fund II, L.P.	22,839,216	2,735,834
Riverside Micro-Cap Fund III, L.P.	160,207,807	4,347,998
Riverside Micro-Cap Fund IV, L.P.	77,775,021	3,617,302
Riverside Micro-Cap Fund IV B, L.P.	16,067,277	2,881,051
Riverside Micro-Cap Fund V, L.P.	55,098,662	50,558,380
Science Ventures Fund II, L.P.	32,366,892	2,300,000
Science Ventures Fund III, LP	8,960,570	17,500,000
Shamrock Capital Content Fund I, L.P	35,655,058	21,037,779
Shamrock Growth Capital Fund IV, L.P.	48,746,744	3,217,536
Silver Lake Partners II, L.P.	10,104	3,531,586
Silver Lake Partners III, L.P.	15,755,390	11,910,583
Silver Lake Partners IV, L.P.	84,804,394	1,457,480
Silver Lake Partners V, L.P.	90,469,089	11,583,940
Silver Lake Partners VI, L.P.	19,821,280	57,350,465
Silver Lake SL SPV-2	54,432,629	0

	Adjusted Reported Value	Unfunded Commitment
SK Capital Partners V, L.P.	34,433,769	18,990,681
SKCP Catalyst Fund I-A, L.P.	13,839,640	20,335,379
SM/TCP L.P.	10,282,740	1,386,616
SMRS - TOPE LLC	3,970,422,063	165,920,571
SMRS-CAPP LLC	148,249,447	13,331,651
SMRS-NCRP LLC	439,672,726	171,958,521
Summit Partners Growth Equity Fund X, L.P.	62,244,107	48,259,997
Sycamore Partners III, L.P.	27,905,650	68,761,459
TCW/Crescent Mezzanine Partners V, LLC	581,477	12,395,466
TCW/Crescent Mezzanine Partners VC Secondary	292,485	0
The Huron Fund III, L.P.	6,386,118	2,072,756
The Huron Fund IV, L.P.	30,966,109	384,454
The Huron Fund V, L.P.	12,582,614	17,784,697
** The Veritas Capital Vantage Fund, L.P.	0	60,000,000
Thoma Bravo Discover Fund II, L.P.	103,294,670	13,418,180
Thoma Bravo Fund XII, L.P.	237,574,759	20,521,950
Thoma Bravo Fund XIII, L.P.	149,094,931	38,426,399
Thoma Bravo XIV, L.P.	49,161,586	75,838,414
TI Platform BOV, L.P.	10,073,865	6,607,584
TI Platform Fund II, L.P.	8,720,938	6,252,788
** TI Platform Fund III, L.P.	0	25,000,000
TI Platform SMRS SMA, L.P.	31,674,065	29,449,627
TPG Healthcare Partners, L.P.	9,070,926	16,910,359
TPG IV (Texas Pacific Group IV)	84,436	211,725
TPG Partners VI, L.P.	27,467,666	7,467,821
TPG Partners VIII, L.P.	30,642,599	96,591,372
TPG Partners, VII, L.P.	165,537,364	12,452,477
TPG V (Texas Pacific Group V)	580,603	5,841,509
Trilantic Capital Partners V (North America) Fund A, L.P.	30,533,313	2,921,917
Trilantic Capital Partners VI (North America) L.P.	26,803,891	48,306,170
TSG6, L.P.	39,689,596	21,105,230
TSG7 A L.P.	155,249,454	27,692,252
TSG8, L.P.	47,039,257	102,034,208
Turnbridge Capital Partners I , L.P.	48,196,964	30,387,163
Veritas Capital Fund V, L.P.	167,899,590	8,898,273
Veritas Capital Fund VI, L.P.	246,943,072	6,390,783
Veritas Capital Fund VII, L.P.	56,670,587	27,750,081
Veritas V Co-Investors, L.P.	94,234,930	0
Vista Equity Endeavor Fund I, L.P.	41,982,768	18,255,571
Vista Equity Endeavor Fund II, LP	10,407,750	53,606,130
Vista Equity Partners Fund V, L.P.	64,295,547	11,166,072
Vista Equity Partners Fund VI, L.P.	108,496,004	15,067,655
Vista Equity Partners VII, L.P.	50,075,007	27,785,454
Vista Foundation Fund III, L.P.	25,641,493	7,130,053
Vista Foundation Fund IV, L.P.	19,948,328	53,268,916
Warburg Pincus China-Southeast Asia II, L.P.	17,295,906	61,950,000

	Adjusted Reported Value	Unfunded Commitment
Warburg Pincus China, L.P.	67,362,149	2,632,500
Warburg Pincus Energy MCIP, L.P.	0	10,396,887
Warburg Pincus Energy, L.P.	50,331,369	10,323,679
Warburg Pincus Equity Partners, L.P.	1,178,718	0
Warburg Pincus Financial Sector, L.P.	46,539,052	6,727,500
Warburg Pincus Global Growth, L.P.	110,371,641	48,450,000
Warburg Pincus Private Equity IX, L.P.	2,783,822	0
Warburg Pincus Private Equity X, L.P.	7,854,953	0
Warburg Pincus Private Equity XI, L.P.	112,979,090	0
Warburg Pincus Private Equity XII Secondary, L.P.	31,773,560	337,500
Warburg Pincus Private Equity XII, L.P.	222,744,860	2,362,500
Total Private Equity	\$20,460,347,292	\$ 8,034,588,133
Cash	311,921,438	0
Active Small Cap Cash	33,159,822	
Active Small Cap	20,283,317	0
Income Accruals	(5)	0
Grand Total	\$20,825,711,865	\$ 8,034,588,133

* Total Private Equity amounts do not include Cash and Active Small Cap

** New Commitments made during quarter reported

State of Michigan Retirement System

DOMESTIC EQUITY REVIEW

State of Michigan Investment Board Meeting
September 16, 2021



Jack A. Behar, CFA
Senior Investment Manager
Domestic Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	47.3%	18.1%	18.1%	13.9%	14.7%
S&P 1500	42.1%	18.1%	17.4%	13.8%	14.6%
Peer Median Return	41.5%	16.2%	16.0%	10.9%	12.1%
Percentile Rank vs. Peers *	11	11	11	13	16

*State Street Universe greater than \$1 billion

- In the quarter ended June 30, 2021, Domestic Equity Division outperformed its peer group and matched or exceeded the S&P 1500 Index over all time periods. During the past year, performance was over 520 basis points (bps) ahead of the benchmark with incurred tracking error of 2.1%.
- A number of managers in SMRS' portfolio, both internal and external, and across both value and growth styles, contributed to strong performance on the year.
- On the internal management side, SMRS' value-oriented strategies continued to outperform and extend their gains, beating the S&P 1500 by nearly 20%.
- SMRS' Disruptive Innovation Momentum fund returned nearly 80%, outperforming the S&P 1500 by over 50%, as well as peers such as Ark Investments.
- SMRS' Value, Quality and Momentum index fund provided steady outperformance, besting the S&P 1500 by over 100bps.
- On the external manager side, Ark Investments continued to handily outperform the market, finishing ahead of the S&P 1500 by more than 40%.
- Meanwhile a trio of Michigan-based value managers, Ancora Asset Management, Seizert Capital Partners and Clarkston Capital, combined to beat the S&P 1500 by well over 10%. Ancora in particular had a strong year, returning over 60%.

Asset Class Goal

To provide the SMRS with long-term domestic equity market returns or better, by investing in a diversified and attractively valued portfolio of companies at an index fund-like cost.

Strategy Update

- The Domestic Equity Division continues to be positioned for an economic recovery, with a portfolio beta of 1.07 and a relative overweight to small cap, value and momentum stocks.
- There are a number of crosscurrents we are paying close attention to that could impact our positioning over the coming year. In particular, higher interest rates driven by inflationary pressure, coupled with continued appreciation of equity markets, could make stocks less appealing over time.
- DED sector overweights include health care, financials, communication services and utilities. Underweights include consumer discretionary and industrials.
- The division's portfolio trades at nearly a 25% discount to the S&P 1500, despite higher levels of profitability and faster rates of reinvestment.

Market Environment and Outlook

- At ~23X forward earnings, equity markets trade at a premium to both their long-term historical average of 15.7X and their twenty-five-year average of 21X.
- Meanwhile 10-year treasury bonds trade at a yield of 1.4%, or ~70X earnings, versus their long-term historical average of 5%, or ~20X earnings.
- Factoring this in, alongside the enormous influx of money injected into the financial system by the Federal Reserve, the sharp rebounding of the economy, continued economic stimulus, and the continued availability of many attractively valued companies, stocks remain a reasonable alternative to bonds and bond-like asset classes.
- Long-term we expect the market to return roughly 7.9%, driven by a dividend yield of 1.5% and earnings per share growth of 6.4%.
- EPS growth is expected to be driven by 4.5% economic growth + 1.9% growth in the form of share buybacks. Such EPS growth is roughly in line with the S&P 500 thirty-year historical dividend growth rate.

SMRS

Domestic Equity Strategies

6/30/21

Markets	Amount	Total	% of Total
Internal Indexed (\$ in Millions)			
Indexed Portfolios	\$10,337		
Total Indexed		\$10,337	46.6%
Internal Active			
Active Portfolios	\$6,635		
Total Internal Active		\$6,635	29.9%
External Active			
Los Angeles Capital	\$1,572		
Mellon Capital	977		
ARK Investments	740		
Seizert Capital Partners	568		
Clarkston Capital Partners	541		
Martin Currie US LT Unconstrained	323		
Attucks Asset Management	132		
Bivium Capital	130		
Ancora	112		
Managed Asset Portfolio	<u>101</u>		
Total External Active		\$5,197	23.5%

Total Domestic Equity

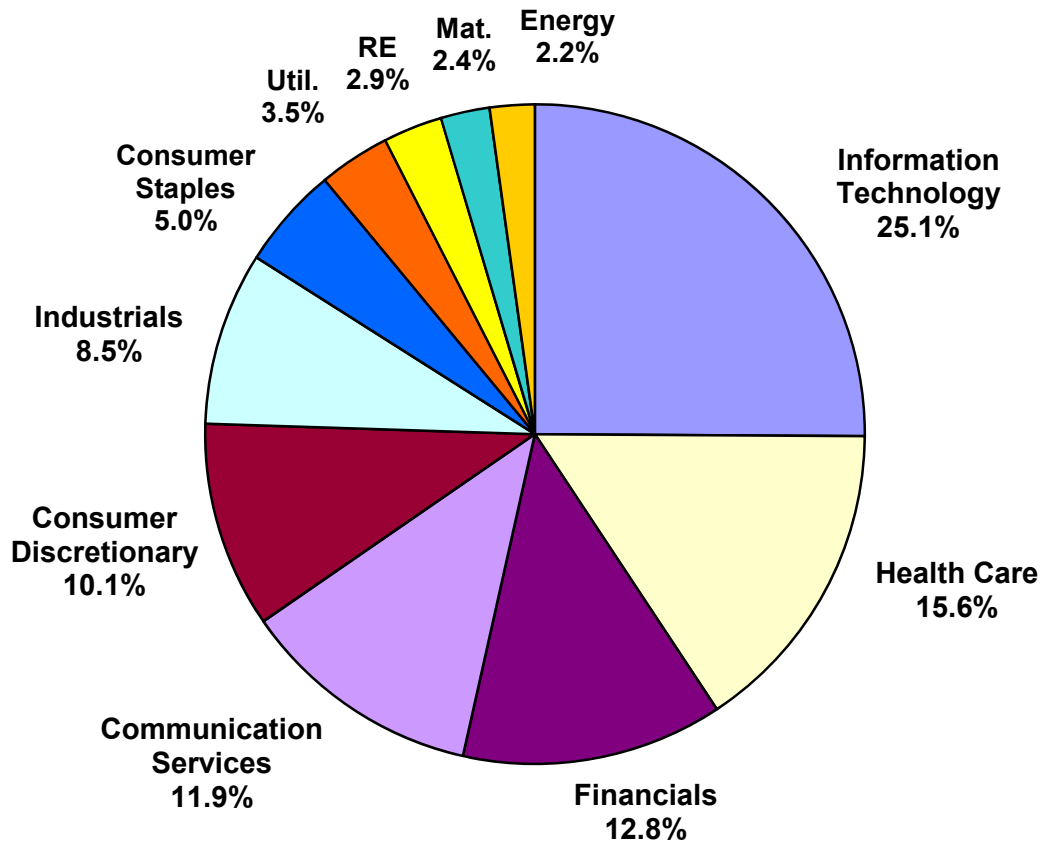
\$22,169

100.0%

SMRS

Domestic Equity By Sector

6/30/21



Market Value in Millions				
6/30/21				
	Assets	Percent	Benchmark	Difference
Information Technology	\$5,561	25.1%	26.3%	-1.2%
Health Care	3,456	15.6%	12.8%	2.8%
Financials	2,835	12.8%	11.7%	1.1%
Communication Services	2,640	11.9%	10.3%	1.6%
Consumer Discretionary	2,236	10.1%	12.5%	-2.4%
Industrials	1,889	8.5%	9.3%	-0.8%
Consumer Staples	1,098	5.0%	5.7%	-0.7%
Utilities	785	3.5%	2.5%	1.0%
Real Estate	646	2.9%	3.1%	-0.2%
Materials	524	2.4%	2.9%	-0.5%
Energy	499	2.2%	2.9%	-0.7%
Total	\$22,169	100.0%	100.0%	

Benchmark: S&P 1500

SMRS

Domestic Equities Composite

6/30/21

	<u>6/30/21</u>	<u>3/31/21</u>	<u>12/31/20</u>	<u>9/30/20</u>
Assets (\$ in Millions):	\$22,169	\$20,408	\$19,046	\$16,491
Number of Securities:	2,965	1,346	1,317	1,292
Active Share:	32%	36%	37%	35%

Description: The Domestic Equities Composite seeks to deliver excess returns through a blend of index investing and active management with value-added, but diverse strategies. While the goal is for most managers to outperform in the long run, the composite is designed such that they do so during differing parts of the business cycle.

	<u>SMRS</u>	<u>S&P 1500</u>
Characteristics:		
Market Cap. (\$ in Billions)	\$438.9	\$531.4
FY1 P/E	17.5	22.8
P/E upside to S&P 1500	30.3%	0.0
Return on Equity	25.6%	17.4%
Risk Metrics		
Beta	1.07	1.00
Tracking Error	2.6%	0.0%
Projected Returns		
Dividend Yield	1.5%	1.3%
Buyback Yield	1.6%	1.4%
Reinvestment Rate	<u>7.5%</u>	<u>5.5%</u>
Projected Investment Return	10.6%	8.2%

TOP TEN EXPOSURES - Domestic Equities vs S&P 1500

6/30/21

<u>Domestic Equity Portfolio</u>		<u>S&P 1500</u>	
<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Company Name</u>	<u>Market Weight</u>
SPDR S&P 500 ETF Trust	4.8%	Apple Inc.	5.7%
Apple Inc.	4.4%	Microsoft Corporation	5.3%
Microsoft Corporation	4.3%	Amazon.com Inc.	3.9%
Facebook, Inc. Class A	3.4%	Facebook, Inc. Class A	2.1%
Amazon.com Inc.	2.8%	Alphabet Inc., Class A	1.9%
Bristol-Myers Squibb Company	1.9%	Alphabet Inc., Class C	1.9%
Alphabet Inc. Class A	1.6%	Berkshire Hathaway Inc. Class B	1.3%
AT&T, Inc.	1.3%	Tesla, Inc.	1.3%
Alphabet Inc., Class C	1.2%	NVIDIA Corporation	1.3%
CVS Health Corporation	<u>1.2%</u>	JPMorgan Chase & Co.	<u>1.2%</u>
TOTAL	<u>26.9%</u>	TOTAL	<u>25.9%</u>

Manager Performance - Net of Fees

6/30/21

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
SMRS S&P 500 Index	\$9,690,682,004	40.8%	18.6%	17.7%	14.2%	--	N/A
S&P 500		40.8%	18.7%	17.6%	14.1%	--	
Style & Risk Adjusted Benchmark		40.6%	18.6%	17.6%	14.1%	--	
Lipper Large-Cap Core		40.0%	17.8%	16.7%	13.0%	--	
<i>Excess Return</i>		<i>0.0%</i>	<i>-0.1%</i>	<i>0.0%</i>	<i>0.1%</i>	<i>--</i>	
<i>Alpha</i>		<i>0.1%</i>	<i>0.0%</i>	<i>0.1%</i>	<i>0.1%</i>	<i>--</i>	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		<i>47</i>	<i>44</i>	<i>38</i>	<i>22</i>	<i>--</i>	
SMRS Large-Cap Core	1,983,274,731	105.1%	18.7%	19.8%	14.0%	10.9%	8/31/07
S&P 500		40.8%	18.7%	17.6%	14.1%	10.4%	
Style & Risk Adjusted Benchmark		49.7%	11.5%	17.5%	12.9%	12.3%	
Lipper Large-Cap Core		40.0%	17.8%	16.7%	13.0%	9.7%	
<i>Excess Return</i>		<i>64.3%</i>	<i>0.0%</i>	<i>2.1%</i>	<i>-0.1%</i>	<i>0.6%</i>	
<i>Alpha</i>		<i>55.4%</i>	<i>7.2%</i>	<i>2.3%</i>	<i>1.2%</i>	<i>-1.3%</i>	
<i>Pct Rank vs Lipper Large-Cap Core</i>		<i>1</i>	<i>42</i>	<i>5</i>	<i>28</i>	<i>11</i>	
SMRS All-Cap Garp	1,814,162,348	31.2%	11.8%	13.1%	10.2%	13.0%	4/30/11
S&P 1500 Super Composite		42.1%	18.1%	17.4%	13.8%	14.2%	
Style & Risk Adjusted Benchmark		35.9%	17.1%	16.6%	13.1%	14.0%	
Lipper Multi-Cap Core		42.4%	15.9%	15.8%	11.8%	12.4%	
<i>Excess Return</i>		<i>-10.9%</i>	<i>-6.4%</i>	<i>-4.3%</i>	<i>-3.7%</i>	<i>-1.3%</i>	
<i>Alpha</i>		<i>-4.7%</i>	<i>-5.4%</i>	<i>-3.5%</i>	<i>-3.0%</i>	<i>-1.0%</i>	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		<i>92</i>	<i>87</i>	<i>84</i>	<i>80</i>	<i>41</i>	
Mellon US Equity Enhanced	976,936,996	33.0%	29.4%	--	--	28.8%	3/1/17
S&P 500		40.8%	18.7%	--	--	17.0%	
Style & Risk Adjusted Benchmark		41.9%	18.7%	--	--	17.7%	
Lipper Large-Cap Core		40.0%	17.8%	--	--	16.2%	
<i>Excess Return</i>		<i>-7.8%</i>	<i>10.7%</i>	<i>--</i>	<i>--</i>	<i>11.8%</i>	
<i>Alpha</i>		<i>-8.9%</i>	<i>10.7%</i>	<i>--</i>	<i>--</i>	<i>11.1%</i>	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		<i>92</i>	<i>1</i>	<i>--</i>	<i>--</i>	<i>1</i>	
SMRS Large-Cap Growth	951,857,767	39.7%	23.1%	22.1%	17.1%	12.4%	5/31/05
S&P 500 Growth		41.4%	23.1%	21.8%	17.4%	12.6%	
Style & Risk Adjusted Benchmark		40.6%	22.6%	21.5%	17.5%	12.6%	
Lipper Large-Cap Growth		40.3%	23.4%	22.6%	17.2%	12.4%	
<i>Excess Return</i>		<i>-1.6%</i>	<i>0.1%</i>	<i>0.3%</i>	<i>-0.3%</i>	<i>-0.1%</i>	
<i>Alpha</i>		<i>-0.9%</i>	<i>0.5%</i>	<i>0.6%</i>	<i>-0.4%</i>	<i>-0.2%</i>	
<i>Pct Rank vs Lipper Large-Cap Growth</i>		<i>56</i>	<i>56</i>	<i>58</i>	<i>60</i>	<i>43</i>	
LA Capital All-Cap Growth	917,794,233	38.5%	19.0%	17.3%	15.7%	13.2%	5/31/05
S&P 1500 Growth		42.0%	22.3%	21.3%	17.0%	12.5%	
Style & Risk Adjusted Benchmark		38.4%	20.7%	19.7%	15.2%	10.5%	
Lipper Multi-Cap Growth		43.5%	23.5%	22.2%	16.1%	12.2%	
<i>Excess Return</i>		<i>-3.5%</i>	<i>-3.2%</i>	<i>-4.0%</i>	<i>-1.3%</i>	<i>0.8%</i>	
<i>Alpha</i>		<i>0.1%</i>	<i>-1.7%</i>	<i>-2.5%</i>	<i>0.4%</i>	<i>2.8%</i>	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		<i>76</i>	<i>82</i>	<i>88</i>	<i>49</i>	<i>26</i>	
Ark Investments	740,462,772	84.3%	36.0%	41.3%	--	40.6%	3/1/16
S&P 1500 Growth		42.0%	22.3%	21.3%	--	21.6%	
Style & Risk Adjusted Benchmark		77.9%	16.3%	33.3%	--	33.5%	
Lipper Multi-Cap Growth		43.5%	23.5%	22.2%	--	22.3%	
<i>Excess Return</i>		<i>42.3%</i>	<i>13.7%</i>	<i>20.0%</i>	<i>--</i>	<i>19.0%</i>	
<i>Alpha</i>		<i>6.4%</i>	<i>19.7%</i>	<i>8.0%</i>	<i>--</i>	<i>7.1%</i>	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		<i>1</i>	<i>9</i>	<i>1</i>	<i>--</i>	<i>1</i>	
Large-Cap Consistent Growth	727,716,471	48.0%	24.6%	21.6%	--	18.1%	3/1/15
S&P 500		40.8%	18.7%	17.6%	--	14.2%	
Style & Risk Adjusted Benchmark		33.7%	22.2%	20.9%	--	16.5%	
Lipper Large-Cap Core		40.0%	17.8%	16.7%	--	13.1%	
<i>Excess Return</i>		<i>7.2%</i>	<i>5.9%</i>	<i>4.0%</i>	<i>--</i>	<i>3.9%</i>	
<i>Alpha</i>		<i>14.3%</i>	<i>2.4%</i>	<i>0.7%</i>	<i>--</i>	<i>1.6%</i>	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		<i>7</i>	<i>1</i>	<i>1</i>	<i>--</i>	<i>1</i>	

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
LA Capital Deep Value	654,479,532	39.5%	7.3%	9.9%	--	7.9%	4/1/15
S&P 1500 Value		41.8%	12.9%	12.6%	--	10.5%	
Style & Risk Adjusted Benchmark		33.8%	14.0%	13.4%	--	11.1%	
Lipper Multi-Cap Value		47.7%	11.8%	12.4%	--	9.5%	
<i>Excess Return</i>		-2.3%	-5.7%	-2.7%	--	-2.6%	
<i>Alpha</i>		5.7%	-6.7%	-3.6%	--	-3.3%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		84	96	88	--	88	
SMRS Mid-Cap Index	646,605,866	52.9%	13.1%	14.6%	11.6%	--	N/A
S&P 400		53.2%	13.2%	14.3%	11.2%	--	
Style & Risk Adjusted Benchmark		53.2%	13.1%	14.2%	11.1%	--	
Lipper Mid-Cap Core		50.4%	13.1%	13.4%	9.6%	--	
<i>Excess Return</i>		-0.3%	0.0%	0.3%	0.4%	--	
<i>Alpha</i>		-0.3%	0.0%	0.4%	0.5%	--	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		36	49	29	15	--	
Seizert Capital Partners	567,801,216	54.1%	16.0%	16.7%	11.4%	14.6%	11/30/09
S&P 1500 Value		41.8%	12.9%	12.6%	10.0%	12.8%	
Style & Risk Adjusted Benchmark		40.8%	12.8%	12.4%	10.0%	12.9%	
Lipper Multi-Cap Value		47.7%	11.8%	12.4%	9.0%	11.7%	
<i>Excess Return</i>		12.3%	3.0%	4.0%	1.3%	1.8%	
<i>Alpha</i>		13.3%	3.2%	4.2%	1.3%	1.7%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		23	9	4	11	3	
Clarkston Capital Small/Mid-Cap	540,813,560	49.9%	16.6%	15.3%	13.9%	13.9%	1/1/14
S&P 400		57.3%	12.9%	14.8%	11.5%	11.6%	
Style & Risk Adjusted Benchmark		47.0%	8.2%	11.1%	8.8%	9.0%	
Lipper Mid-Cap Core		50.4%	13.1%	13.4%	9.6%	9.8%	
<i>Excess Return</i>		-7.4%	3.7%	0.6%	2.4%	2.4%	
<i>Alpha</i>		2.9%	8.4%	4.2%	5.2%	4.9%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		46	5	18	5	2	
Value, Quality, Momentum Composite	379,083,139	--	--	--	--	30.7%	10/1/20
S&P 1500		--	--	--	--	30.9%	
Style & Risk Adjusted Benchmark		--	--	--	--	32.6%	
Lipper Multi-Cap Core		--	--	--	--	31.9%	
<i>Excess Return</i>		--	--	--	--	-0.2%	
<i>Alpha</i>		--	--	--	--	-1.8%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		--	--	--	--	58	
Martin Currie	322,956,323	--	--	--	--	29.2%	11/1/20
S&P 1500 Growth		--	--	--	--	31.1%	
Style & Risk Adjusted Benchmark		--	--	--	--	32.0%	
Lipper Multi-Cap Growth		--	--	--	--	30.3%	
<i>Excess Return</i>		--	--	--	--	-2.0%	
<i>Alpha</i>		--	--	--	--	-2.8%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		--	--	--	--	59	
Disruptive Innovation Momentum	313,973,674	--	--	--	--	85.9%	9/1/20
MSCI Momentum Index		--	--	--	--	13.5%	
Style & Risk Adjusted Benchmark		--	--	--	--	59.1%	
Lipper Multi-Cap Growth		--	--	--	--	24.1%	
<i>Excess Return</i>		--	--	--	--	72.4%	
<i>Alpha</i>		--	--	--	--	26.8%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		--	--	--	--	1	
Attucks Asset Management	132,295,646	38.0%	11.3%	12.5%	9.0%	7.7%	11/30/07
S&P 1500		42.1%	18.1%	17.4%	13.8%	10.1%	
Style & Risk Adjusted Benchmark		35.5%	12.3%	11.9%	9.6%	10.1%	
Lipper Multi-Cap Core		42.4%	15.9%	15.8%	11.8%	8.7%	
<i>Excess Return</i>		-4.2%	-6.9%	-4.9%	-4.8%	-2.4%	
<i>Alpha</i>		2.5%	-1.0%	0.7%	-0.6%	-2.4%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		75	89	87	89	76	

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
Bivium Capital Partners	129,571,704	40.1%	11.3%	12.1%	8.8%	7.2%	11/30/07
S&P 1500 Value		41.8%	12.9%	12.6%	10.0%	7.4%	
Style & Risk Adjusted Benchmark		44.6%	18.5%	12.2%	9.8%	10.3%	
Lipper Multi-Cap Value		47.7%	11.8%	12.4%	9.0%	7.1%	
<i>Excess Return</i>		-1.7%	-1.7%	-0.5%	-1.2%	-0.1%	
<i>Alpha</i>		-4.5%	-7.3%	-0.1%	-0.9%	-3.1%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		81	58	53	53	48	
Ancora	112,083,539	65.8%	13.5%	--	--	12.9%	10/1/17
S&P 1000		57.3%	12.9%	--	--	13.3%	
Style & Risk Adjusted Benchmark		53.5%	10.5%	--	--	10.3%	
Lipper Mid-Cap Core		50.4%	13.1%	--	--	12.3%	
<i>Excess Return</i>		8.5%	0.6%	--	--	-0.4%	
<i>Alpha</i>		12.3%	3.0%	--	--	2.6%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		5	45	--	--	44	

State of Michigan Retirement System

INTERNATIONAL EQUITY REVIEW

State of Michigan Investment Board Meeting

September 16, 2021



Patrick M. Moraniec, CFA
Senior Investment Manager
International Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (3/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	53.2%	7.7%	10.9%	6.8%	6.4%
MSCI ACWI ex USA Returns	49.4%	6.5%	9.8%	5.3%	5.1%
Peer Median Returns	53.2%	7.1%	10.1%	6.0%	6.1%
Percentile Rank vs. Peers*	52	39	31	29	33

*Source: State Street Universe greater than \$1 billion

- The International Equity Division (IED) outperformed both peers and the division's benchmark over all listed periods.
- The portfolio outperformed the benchmark by 3.8% over the last twelve months.
- Outperformance was driven by the value factor, momentum factor, energy sector, and information technology sector.

Asset Class Goals

- Construct a non-U.S. equity-focused portfolio to generate, on a consistent basis, ten-year returns that exceed the MSCI ACWI ex USA by 1.0%.
- Perform in the top half of the public plan peer universe percentile rankings.
- Advance people, processes, and systems to continuously improve investment decisions.

Strategy

- The division allocates capital with the intention of persistent exposure to the quality factor, momentum factor, and value factor.
- Persistent factor exposures should create consistent, transparent, and efficient returns.
- Current portfolio drivers of risk and return.
 - Tracking error of the portfolio is approximately 1.8%, which is below the division's risk budget of 3.0%.
 - The division's core strategy of exposure to the quality, value and momentum factors (QVM), accounts for only 34.0% of the total tracking error indicating that long-term, the portfolio is not materially exposed to any one single risk.
- Quarterly changes to International Equity Division allocation.
 - Rebalanced \$0.8 billion of equity swaps to match the division's long-term equity factor strategy.
 - Allocated \$0.2 billion of Internal Stock Plus' Tier 3 collateral to LGT Crown European Private Debt III (CEPD III). The investment improves the estimated returns of the collateral portfolio without taking on additional undo market risk.

Market Environment and Outlook

Market Performance

- International stock markets continue to ascend in 2021, up another 9.2% through end of June 2021. Over the last twelve months stocks have risen 35.7%. Fundamentals have accelerated year-over-year, supporting the above average returns over the last year.
- Performance of the quality, value, and momentum factors remains strategically important to the IED. The value factor outperformed the MSCI ACWI ex USA by 6.0% year-to-date. The quality factor has fought back and is now ahead of the benchmark by 1.0%. The momentum factor continues to lag, underperforming the benchmark by -4.6%. IED's core strategy remains balanced and consistent, outperforming the division's benchmark again this year by 1.8% year-to-date.
- Emerging markets underperformed the MSCI ACWI ex USA by -1.7% year-to-date. Developed markets outperformed the broader index by 0.8%.
- The U.S. dollar is up year-to-date 2.8%.
- Commodities have surged in 2021, up 21.2% year-to-date, outperforming international stocks by 12.0%. Oil and copper are both up 51.4% and 21.9% for the year indicating a full recovery is underway. Gold has declined -6.5% this year.
- Global government interest rates (index weighted) remain subdued, at approximately 1.3%.

Outlook

- Global stock markets and commodity markets have looked beyond trailing economic fundamentals in anticipation of a fully reopened economy and potentially the emergence of global inflation. Record levels of central bank liquidity have driven stock markets to new market highs despite an above average global recession which is different than prior economic cycles.
- More recently, several signs indicate the global economy is accelerating. The key question remains, can the global economy deliver on the stock market's lofty 2021 growth expectations.
- Europe top line sales and earnings expanded year-over-year at 1.2% and 24.2%. This marks an upward acceleration in trailing fundamentals for Europe. Forward looking sales and earnings per share have continued to improve and are expected to be up over the next 12 months, 5.1% and 19.1% respectively.
- Japan has been slower in its recovery relative to other nations. Sales per share declined year-over-year albeit at a slower pace -3.8%. Earnings per share have bottomed and begun expanding up 15.7% since last year. Forward looking sales and earnings growth are forecasted at 2.8% and 18.8%.

- Central banks are fully committed to an “anything it takes” policy. The vast amounts of liquidity have offset the gap between high market valuations and actual fundamentals. Year-to-date the fundamentals strengthened especially as the markets lap lower year-over-year comparisons. Forward looking estimates, especially sales per share, appear to be moderating indicating above average top line sales growth for next year may be challenging.
- Analysts’ expectations are high with forward-looking earnings per share growth estimated at 19.3% for the MSCI ACWI ex USA index.
- Go-forward returns for the MSCI ACWI ex USA index on an annualized basis are estimated at 7.9%. This rate is based on the current price and actual fundamentals over multiple periods to remove fundamental variability, better estimating the earnings power of the index.
- A ten-year blended international government yield of 1.3% implies an international equity risk premium of 6.6%. The equity risk premium increased slightly during the quarter due to minor increases to the long-term earnings projections of the index.

Conclusion

International stock market fundamentals are accelerating. Global government bond yields remain near all-time lows as central banks remain committed to ultra-accommodative monetary policies not seen since the Great Financial Crisis. The policies in Japan, Europe, and now the U.S. are open-ended inflation targeting processes.

As stock markets lap their year-over-year fundamental comparisons, the question becomes what multiples investors are willing to pay if the growth projections moderate or even decline. Rising cases with new COVID-19 variants may spark policy decisions that could curtail economic activity relative to the last twelve months.

Forward looking estimates for stock markets remain elevated. International stocks are expected to grow earnings per share by 19.3% in the next twelve months. The market trades at 21.1x price to earnings which is above its twenty-three-year average of 17.0x. The annualized go-forward return of 7.9% is still a wide spread relative to global risk-free rates. To capture the spread to bonds, international stock investors will need a long investment horizon as the short-term environment may experience increased volatility.

SMRS

International Equity Strategies

6/30/21

Markets	Amount	Total	% of Total
Active (\$ in Millions)			
BlackRock MSCI	\$2,697		
Wellington	1,159		
IED Quality Equity	779		
Martin Currie	580		
Marathon-London	394		
Lazard	304		
UBS	239		
Total Active		\$6,151*	38.4%
Stock Plus			
Internal	\$3,745		
PIMCO	2,516		
Total Stock Plus		\$6,262	39.0%
Indexed			
SSGA	\$1,890		
BlackRock	1,741		
Total Indexed		\$3,630	22.6%

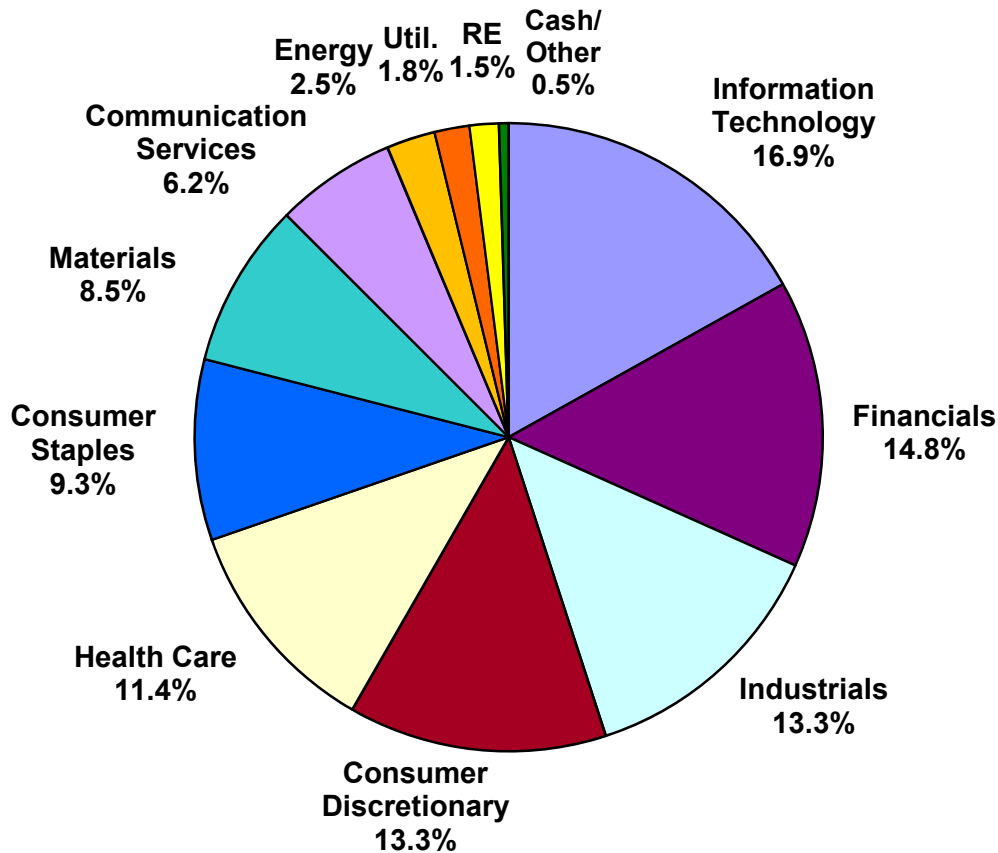
*Note: Total includes residual cash total of \$1,148,292 from the closed fund of LA Capital World ex US.

TOTAL	<u>\$16,043</u>	<u>100.0%</u>
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SMRS

International Equity By Sector

6/30/21



Market Value in Millions				
6/30/21				
	Assets	Percent	Benchmark	Difference
Information Technology	\$2,711	16.9%	13.4%	3.5%
Financials	2,369	14.8%	18.6%	-3.8%
Industrials	2,143	13.3%	12.1%	1.2%
Consumer Discretionary	2,143	13.3%	13.2%	0.1%
Health Care	1,825	11.4%	9.4%	2.0%
Consumer Staples	1,497	9.3%	8.5%	0.8%
Materials	1,360	8.5%	8.7%	-0.2%
Communication Services	995	6.2%	6.2%	0.0%
Energy	395	2.5%	4.4%	-1.9%
Utilities	289	1.8%	3.0%	-1.2%
Real Estate	238	1.5%	2.5%	-1.0%
Total Investments	\$15,965	99.5%	100.0%	
Cash/Other	78	0.5%	0.0%	0.5%
Total	\$16,043	100.0%	100.0%	

Benchmark: MSCI ACWI ex USA

SMRS

International Equities

6/30/21

Date:	<u>6/30/21</u>	<u>3/31/21</u>	<u>12/31/20</u>	<u>9/30/20</u>
Assets (\$ in Millions):	\$16,043	\$15,094	\$14,527	\$12,315
Number of Securities:	2,624	2,632	2,616	2,655
Active Share:	33%	34%	34%	33%

Benchmark: MSCI ACWI ex USA

Description: The International Equities Composite represents all International Equity Division investments.

Portfolio Characteristics:

	SMRS		MSCI ACWI ex USA	
	<u>LTM</u>	<u>Normalized</u>	<u>LTM</u>	<u>Normalized</u>
Return:				
Annualized Total Return	9.8%	9.1%	8.3%	7.9%
Sustainable Growth Rate	7.2%	6.5%	6.6%	6.0%
Dividend Yield	1.8%	1.8%	1.8%	1.9%
Buyback Yield	0.0%	0.0%	-0.1%	0.0%
Collateral Yield	0.8%	0.8%	--	--
Risk:				
Beta	0.97	--	1.00	--
Volatility	18.5%	--	19.1%	--
Tracking Error	1.6%	--	0.0%	--
Information Ratio	0.9	0.8	--	--
Fundamental:				
Average Capitalization (\$ in Billions)	107.4	--	111.0	--
Price/Earnings	17.8	21.1	19.8	22.6
Price/Book	1.9	2.2	2.0	2.4
ROE	10.5%	10.5%	10.1%	10.4%

TOP TEN HOLDINGS

(\$ in Billions* - \$ in Millions**)

	<u>Portfolio Weight</u>	<u>Market Capitalization*</u>	<u>FY1 P/E</u>	<u>Market Value**</u>
ASML Holding NV	2.6%	\$288.2	46.2	\$410.5
Taiwan Semiconductor Manufacturing Co., Ltd.	2.4%	553.7	26.1	383.4
Samsung Electronics Co., Ltd.	1.8%	481.6	14.3	288.7
Tencent Holdings	1.6%	721.6	31.7	251.4
Roche Holding	1.4%	330.0	18.0	224.8
Nestle S.A.	1.4%	350.9	26.0	223.1
Alibaba Group	1.3%	614.4	22.9	215.4
Novo Nordisk A/S Class B	0.9%	148.5	27.1	144.0
Toyota Motor	0.8%	285.5	10.8	134.1
Vale S.A.	<u>0.8%</u>	<u>119.3</u>	4.4	<u>132.0</u>
TOTAL	<u>15.0%</u>	<u>\$3,893.7</u>		<u>\$2,407.4</u>

International Equity Performance - Net of Fees
6/30/21

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
Total International Equity	\$16,042,946,750	40.1%	10.8%	12.3%	6.8%	6.8%	1/1/04
MSCI ACWI ex USA		35.7%	9.4%	11.1%	5.3%	6.8%	
Lipper International Multi-Cap Core		33.7%	8.1%	10.0%	5.2%	6.2%	
Excess Return		4.4%	1.4%	1.2%	1.5%	0.0%	
Pct Rank vs. Lipper International Multi-Cap Core		12	4	3	7	17	
Total International Active Strategy	\$6,151,184,710*	38.3%	11.1%	12.4%	6.7%	6.3%	5/1/05
MSCI ACWI ex USA		35.7%	9.4%	11.1%	5.3%	6.3%	
Lipper International Multi-Cap Core		33.7%	8.1%	10.0%	5.2%	5.7%	
Excess Return		2.6%	1.8%	1.3%	1.3%	0.0%	
Pct Rank vs. Lipper International Multi-Cap Core		19	4	3	7	20	
BlackRock MSCI Systematic Return	2,697,146,330	38.5%	--	--	--	17.7%	12/1/18
MSCI ACWI ex USA		35.7%	--	--	--	14.0%	
Lipper International Multi-Cap Core		33.7%	--	--	--	12.6%	
Excess Return		2.8%	--	--	--	3.8%	
Pct Rank vs. Lipper International Multi-Cap Core		19	--	--	--	1	
IED Quality Equity	778,713,909	37.3%	--	--	--	26.3%	2/1/20
MSCI ACWI ex USA		35.7%	--	--	--	16.5%	
Lipper International Multi-Cap Core		33.7%	--	--	--	14.7%	
Excess Return		1.6%	--	--	--	9.8%	
Pct Rank vs. Lipper International Multi-Cap Core		21	--	--	--	1	
Martin Currie International Long-Term	579,559,666	44.8%	20.4%	--	--	18.2%	2/1/17
MSCI ACWI ex USA		35.7%	9.4%	--	--	10.4%	
Lipper International Multi-Cap Core		33.7%	33.7%	--	--	9.4%	
Excess Return		9.1%	11.0%	--	--	7.9%	
Pct Rank vs. Lipper International Multi-Cap Core		4	4	--	--	1	
Wellington IRE	545,717,990	35.1%	9.8%	11.7%	6.0%	5.7%	12/1/05
MSCI World ex USA		33.6%	8.6%	10.4%	4.9%	5.8%	
Lipper International Multi-Cap Core		33.7%	8.1%	10.0%	5.2%	5.2%	
Excess Return		1.5%	1.2%	1.4%	1.1%	-0.1%	
Pct Rank vs. Lipper International Multi-Cap Core		36	12	6	17	23	
Marathon-London International Fund	393,530,578	38.9%	8.6%	10.4%	6.3%	9.3%	2/1/12
MSCI World ex USA		33.6%	8.6%	10.4%	4.9%	7.8%	
Lipper International Multi-Cap Core		33.7%	8.1%	10.0%	5.2%	7.6%	
Excess Return		5.3%	0.1%	0.0%	1.4%	1.6%	
Pct Rank vs. Lipper International Multi-Cap Core		16	43	41	10	4	
Wellington Emerging Markets Local Equity	370,435,483	33.1%	8.7%	11.7%	6.6%	8.0%	12/1/11
MSCI Emerging Market Index		40.9%	11.3%	13.0%	6.4%	5.7%	
Lipper Emerging Markets		42.0%	11.4%	12.1%	5.7%	6.3%	
Excess Return		-7.8%	-2.6%	-1.3%	0.2%	2.3%	
Pct Rank vs. Lipper Emerging Markets		89	79	63	40	24	
Lazard/Wilmington International Equity	303,750,000	30.4%	7.4%	8.0%	4.3%	4.3%	6/1/14
MSCI World ex USA		33.6%	8.6%	10.4%	4.9%	5.7%	
Lipper International Large-Cap Core		33.7%	8.1%	10.0%	5.2%	5.3%	
Excess Return		-3.2%	-1.2%	-2.3%	-0.6%	-1.3%	
Pct Rank vs. Lipper International Large-Cap Core		80	69	90	85	85	
Wellington Select China Equity	242,381,361	66.3%	--	--	--	46.9%	9/1/19
MSCI China On shore		40.2%	--	--	--	42.9%	
Lipper Emerging Markets		42.0%	--	--	--	21.8%	
Excess Return		26.1%	--	--	--	4.0%	
Pct Rank vs. Lipper Emerging Markets		1	--	--	--	2	
UBS China A Opportunity Fund	238,801,128	36.4%	--	--	--	42.8%	5/1/20
MSCI China On shore		40.2%	--	--	--	39.6%	
Lipper Emerging Markets		42.0%	--	--	--	46.8%	
Excess Return		-3.8%	--	--	--	3.1%	
Pct Rank vs. Lipper Emerging Markets		79	--	--	--	65	

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
Total International Stock Plus Strategy	\$6,261,677,405	44.3%	11.3%	12.8%	7.2%	8.7%	1/1/09
MSCI ACWI ex USA		35.7%	9.4%	11.1%	5.3%	8.5%	
Lipper International Multi-Cap Core		33.7%	8.1%	10.0%	5.2%	8.2%	
<i>Excess Return</i>		8.6%	1.9%	1.7%	1.9%	0.2%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		4	4	2	7	26	
Internal Stock Plus	3,745,308,715	45.6%	11.0%	10.5%	6.8%	7.4%	9/1/11
MSCI ACWI ex USA		35.7%	9.4%	11.1%	5.3%	6.7%	
Lipper International Multi-Cap Core		33.7%	8.1%	10.0%	5.2%	7.1%	
<i>Excess Return</i>		9.9%	1.6%	-0.6%	1.4%	0.7%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		2	4	39	7	29	
PIMCO StocksPLUS	2,516,368,690	42.6%	--	--	--	17.8%	4/1/19
MSCI ACWI ex USA		35.7%	--	--	--	13.5%	
Lipper International Multi-Cap Core		33.7%	--	--	--	12.4%	
<i>Excess Return</i>		6.8%	--	--	--	4.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		9	--	--	--	2	

Total International Index Strategy	\$3,630,084,638	35.9%	9.6%	11.9%	6.6%	8.8%	7/1/09
MSCI ACWI ex USA		35.7%	9.4%	11.1%	5.3%	7.7%	
Lipper International Multi-Cap Core		33.7%	8.1%	10.0%	5.2%	7.9%	
<i>Excess Return</i>		0.2%	0.2%	0.8%	1.2%	1.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		29	14	4	7	12	
SSGA MSCI ACWI ex USA Index	1,889,509,814	36.0%	9.7%	--	--	7.7%	11/1/17
MSCI ACWI ex USA		35.7%	9.4%	--	--	7.9%	
Lipper International Multi-Cap Core		33.7%	33.7%	--	--	6.3%	
<i>Excess Return</i>		0.2%	0.3%	--	--	-0.2%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		29	29	--	--	12	
Blackrock ACWI ex USA Index	1,740,574,824	35.9%	9.6%	--	--	7.3%	3/1/18
MSCI ACWI ex USA		35.7%	9.4%	--	--	7.5%	
Lipper International Multi-Cap Core		33.7%	8.1%	--	--	6.3%	
<i>Excess Return</i>		0.2%	0.2%	--	--	-0.2%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		29	15	--	--	27	

* Note: Total includes residual cash total of \$1,148,292 from the closed fund of LA Capital World ex US.

State of Michigan Retirement System

REAL RETURN & OPPORTUNISTIC REVIEW

State of Michigan Investment Board Meeting
September 16, 2021



Jennifer Yeung
Senior Investment Manager
Real Return & Opportunistic Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Real & Opportunistic	35.7%	15.0%	14.6%	11.9%	11.7%
Custom Benchmark	8.3%	6.9%	7.2%	7.1%	7.2%

- The portfolio value is \$11.9 billion with a one-year return of 35.7%. As global markets continued to rebound in the second quarter of 2021, the valuation of our portfolio holdings increased as well.
- Performance for the year was driven by i) income earned from entertainment royalties, investments in asset managers, credit investments, and natural resource strategies; and ii) capital appreciation of our natural resources and media and entertainment assets.

Strategy Update

- The objective of the Real Return & Opportunistic portfolio is to provide an inflation hedge and/or to gain exposure to attractive opportunities that may not fit in another plan portfolio.
- During the quarter, the Real Return & Opportunistic portfolio continued to benefit from exposure to assets with low equity beta and diversity of strategy, industry, and geography.
- The Real Return & Opportunistic portfolio has approximately \$3.5 billion of unfunded commitments. The following new commitments closed during the quarter:
 - \$100 million add-on to Red Cedar Fund 2016, L.P., increasing the total commitment to \$350 million. The Fund focuses on direct lending to upper-middle market, performing companies via senior secured loans. The Fund is expected to generate low double-digit returns.
- In addition to monitoring the impact of COVID-19 and pace of economic recovery, we remain focused on finding differentiated strategies that are additive to the current portfolio mix and continue to favor private credit opportunities and niche strategies with some scalability. Specifically, we like opportunities that have defensible, contractual cash flows and offer structural downside protection. We continue to be selective and favor experienced investment teams with a proven track record.

SMRS

Real Return and Opportunistic

6/30/21

Top Ten Advisors or Entities

(\$ in Millions)

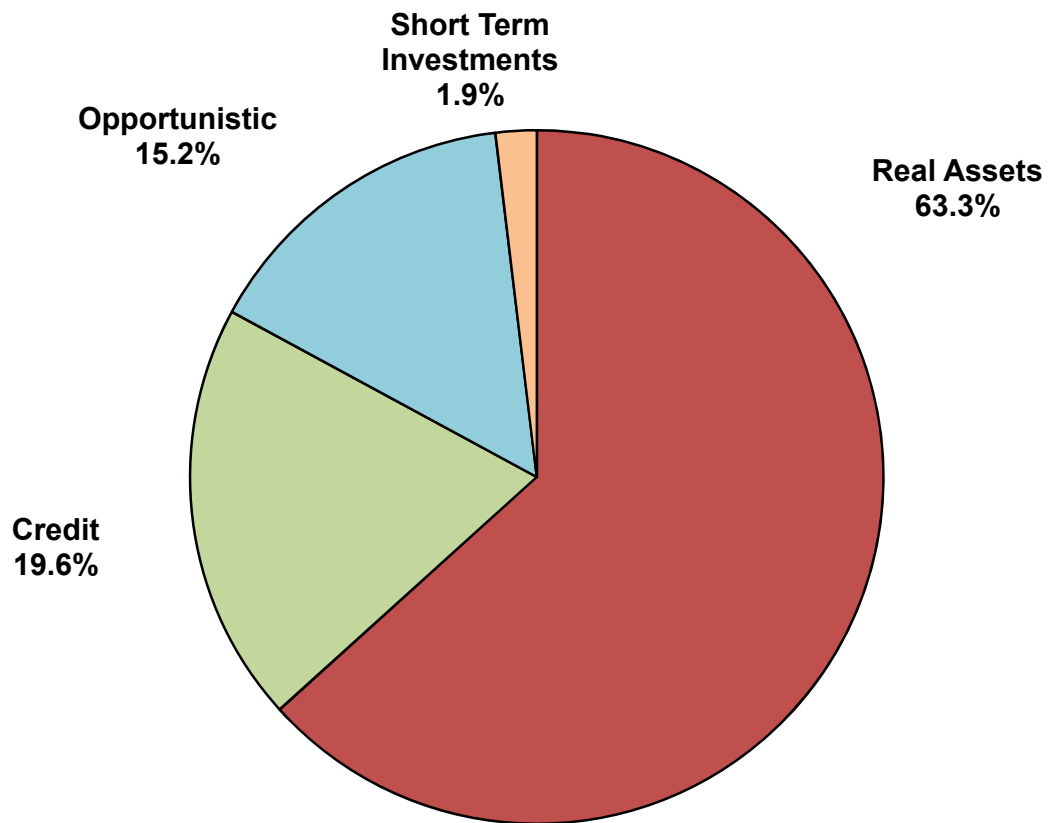
Advisor or Entity	Market Value
Great Mountain Partners, LLC	\$ 4,633
Apollo Global Management	1,043
Barings Alternative Investments	910
Domain Capital Advisors	836
Sixth Street Partners	580
Blackstone Alternative Asset Management	457
Kayne Anderson Capital Partners	337
Czech Asset Management	328
Ridgewood Energy	271
Orion Resource Partners	250
Total Market Value	\$ 9,646

SMRS

Real Return and Opportunistic

6/30/21

Investments By Strategy



Market Value in Millions	
	<u>6/30/21</u>
Real Assets	\$7,520
Credit	\$2,329
Opportunistic	\$1,811
Short Term Investments	<u>\$220</u>
Total Investments	<u>\$11,880</u>

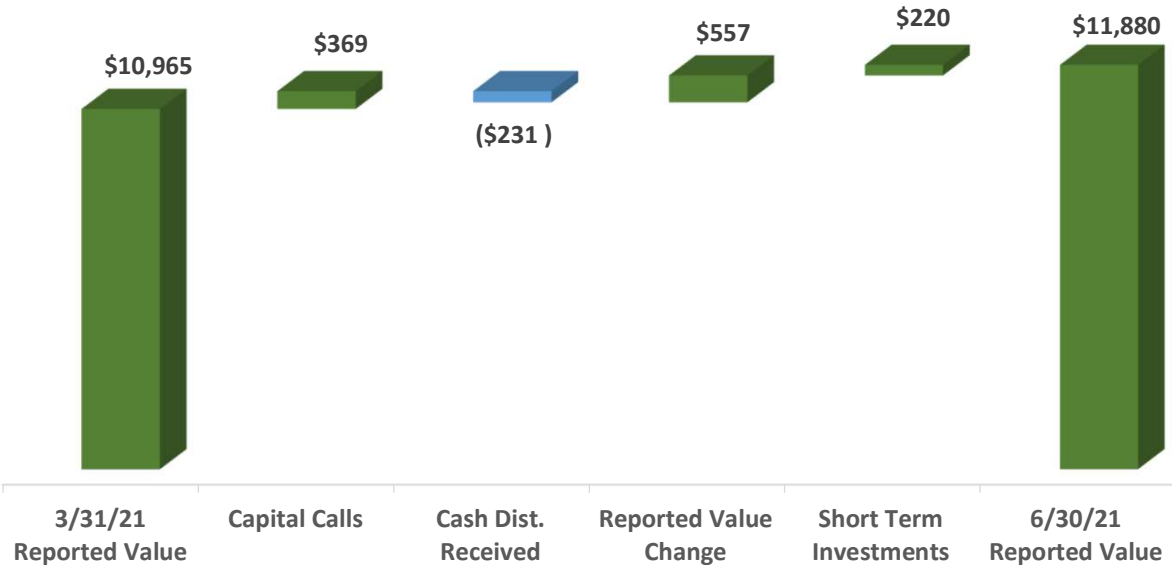
SMRS

Real Return and Opportunistic

6/30/21

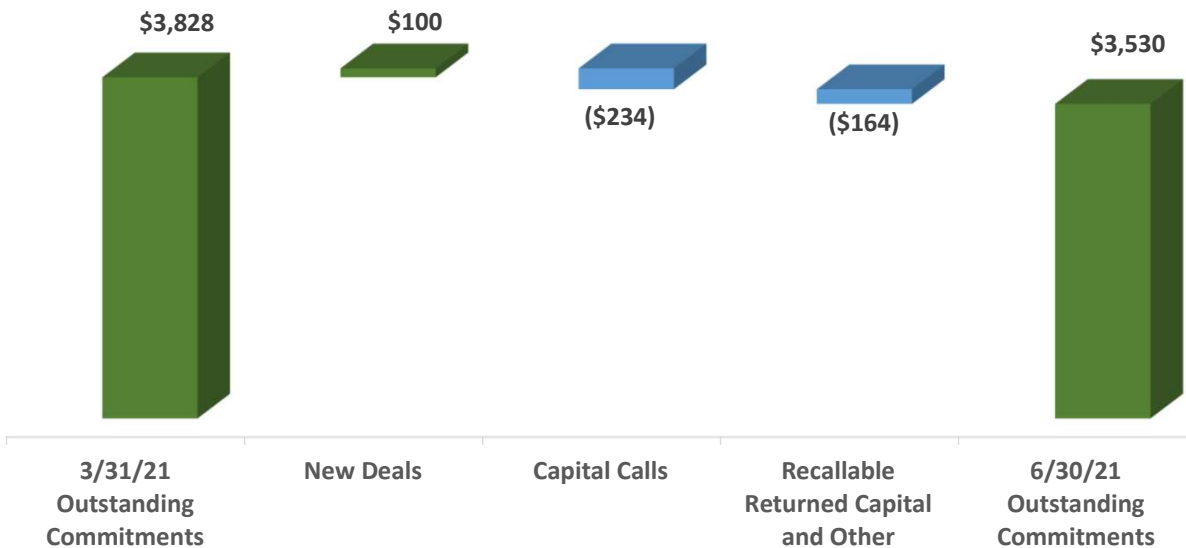
Invested Commitments

\$ Millions



Outstanding Commitments

\$ Millions



SMRS

Real Return and Opportunistic

6/30/21

Net Market Value by Entity

	Net Market Value	Unfunded Commitment
* Abernathy	\$ 283,648,853	\$ 13,047,431
* Abernathy II	5,756,955	0
Altus Midstream	11,814,250	0
Angelo Gordon Credit Solutions Fund	91,501,188	25,325,340
Apollo European Principal Finance Fund II	7,713,697	7,856,831
Apollo HK TMS Investments Holdings LP	187,247	0
Axton Holdings	3,081,354,805	102,242,093
Barings Asset Based Income Fund I	173,260,183	95,867,960
Barings Global Real Asset Fund I	64,224,213	22,468,266
Blackstone Capital Opportunities Fund IV, L.P.	12,315,445	146,146,281
Blackstone COF IV Co-Investment Fund, L.P.		37,500,000
Blackstone Strategic Capital Holdings, LP	94,962,384	43,187,359
Blue Peninsula Fund LP	167,072,881	32,565,820
Broadriver III	132,052,286	49,638,747
BSCH Parallel (MLG) I LP	222,660,287	0
BSCH II	61,580,118	217,500,000
Blackstone Strategic Capital Holdings (Side Car)	76,742,004	31,195,124
Carlyle Energy Mezzanine Opportunity Fund II	20,028,062	7,650,436
Carlyle IEP Co-Invest (Varo)	14,018,144	832,168
Carlyle International Energy Partners	52,484,263	13,445,788
Carlyle International Energy Partners II	22,658,259	119,665,451
Castle Credit SMRS Holdings LLC	123,505,922	92,055,314
Centerbridge SCP III	20,397,200	3,025,715
Centerbridge SCP III, LP – Flex, L.P.	44,789,918	38,769,030
Content Holdings, LLC	355,416,558	46,011,802
Credit Opportunity Fund III	12,283,653	19,478,714
Energy Recap and Restructuring	10,756,216	7,085,025
ERR MI Holdings LP	1,583,304	2,269,933
FCO MA MI LP	169,739,492	35,783,758
Financial Credit Investment II	250,564,473	182,049,979
Financial Credit Investment III	218,348,224	147,390,243
Flywheel Energy Co-Invest	52,399,090	7,000,000
Fortress Transportation & Infrastructure	126,715,767	0
Greatrock LLC	115,036,534	0
Global Maritime	70,506,968	3,414,854
GSO Credit Alpha Fund	36,126,488	37,910,063
HarbourVest Direct Lending Fund (L) L.P.	25,651,644	75,000,000

	Net Market Value	Unfunded Commitment
Hopen Life Science Fund II	3,469,943	485,000
** HPS Red Cedar Fund	213,755,301	113,748,021
HPS Mezzanine Partners 2019, L.P.	32,417,422	27,520,984
Kayne Anderson Energy Fund VII, LP	24,732,385	7,728,837
Kayne Anderson Private Energy Income Fund	124,826,237	35,258,774
Kayne Anderson Private Energy Income Fund II	41,465,579	124,713,485
Kayne Solutions Fund	54,075,467	190,039,000
KKR Energy Income & Growth Fund	34,865,444	0
KKR Lending Partners	5,599,167	8,917,164
KKR Lending Partners II	14,878,554	11,737,239
Lakewater	131,414,766	1,556,450
Lakewater II	83,165,624	54,788
Lakewater III	248,941,302	59,616
Lakewater IV	31,653,202	1,049,139
Lakewater V	84,782,314	3,023,810
Marathon CLO Equity Fund	14,000,945	0
Merit Energy Partners I LP	31,610,467	0
MidCap Finco Holdings LTD	284,394,956	0
Mortgage Servicing Rights	56,152,554	0
Napier Park Aircraft Leasing Vehicle I, LLC	44,434,660	17,944,862
Napier Park AL Rollover Fund I	27,764,608	48,170,469
Nash Co-Investment	16,111,478	94,259
New Fortress Energy HLDGS	1,420,984,565	0
NGP Natural Resources XII	83,697,073	67,625,036
Orion Mine Finance	47,202,830	0
Orion Mine Finance 1A	38,109,410	0
Orion Mine Finance Co-Fund II LP	6,192,464	35,000,000
Orion Co-Investments III, LP	65,999	0
Orion Mine Finance II	108,580,896	7,494,843
Orion Mine Finance III LP	39,629,052	40,375,764
Redding Ridge Holdings, LP	95,783,126	15,155,765
* Ren Venture Fund II	33,501,200	500,000
* Ren Venture Fund III	17,082,205	11,000,000
Ridgewood Energy Oil & Gas II	72,038,769	6,012,709
Ridgewood Energy Oil & Gas III	152,721,541	90,925,016
Ridgewood Fund II Co-Invest (REOG)	21,199,806	3,941,480
Riverside Credit Solutions FD I LP	28,918,584	17,746,522
RPEP Energy Opportunistic Institutional Partners	29,255,878	5,531,550
Sixth Street SSLE II (USD Feeder)	21,127,999	104,135,445
SJC Direct Lending Fund II	1	0
SJC Direct Lending Fund III	181,439,070	23,671,042
SJC Direct Lending Fund III Co-Invest G-III	41,702,850	0
SJC Onshore Direct Lending Fund IV – SMRS-L.P.	120,568,471	127,920,405
* Social Network Holdings	197,069,851	5,590,289

	Net Market Value	Unfunded Commitment
Specialty Loan Fund III	1,823,278	5,821,530
Sprott Private Resource Lending (US), LP	7,951,699	94,674,272
Sprott PRL(M) LP	1,032,411	24,006,633
Sprott PRL(M-Co-Invest) LP	150,622	25,000,000
Structured Credit Recovery Fund IV	180,307,448	0
Terra Co-Investment	46,273,445	14,000,000
TICP CLO Partners II	40,206,646	1,480,904
TICP CLO Partners III	58,350,849	40,542,419
TSSP Agriculture Partners	33,841,032	65,515,874
TSSP Adjacent Opportunities Partners	231,663,241	108,107,672
TSSP Capital Solutions	163,644,380	177,603,021
TSSP Opportunities Partners IV	62,048,470	47,554,243
Turning Rock Fund I, LP	53,665,729	26,167,976
Turning Rock Fund II		75,000,000
Vida Insurance Credit Opportunity Fund II	108,879,845	2,480,092
Warwick (SMRS) Co-Invest, L.P.	30,210,263	2,089,081
Warwick Partners III	49,026,106	2,017,705
Total Real Return and Opportunistic	\$11,660,316,456	\$ 3,530,168,710
Short-Term Investments & Other	220,034,990	
Grand Total	\$11,880,351,445	\$ 3,530,168,710

* Fund of Funds

** New Commitment

State of Michigan Retirement System

REAL ESTATE AND INFRASTRUCTURE REVIEW

State of Michigan Investment Board Meeting
September 16, 2021



Todd A. Warstler
Senior Investment Manager
Real Estate and Infrastructure Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	5.4%	3.5%	6.1%	8.0%	9.0%
NCREIF NPI	6.0%	4.2%	4.8%	6.3%	7.4%
Peer Median Returns	5.5%	5.4%	6.2%	7.8%	9.1%
Percentile Rank vs. Peers*	52	69	53	47	55

*State Street Universe greater than \$1 billion

- Underperformance relative to the one-year benchmark resulted primarily from the Real Estate and Infrastructure Division's (REID) strategy of being overweight in hospitality. Over the ten-year timeframe the REID is outperforming the benchmark by 160 basis points.

Strategy Update

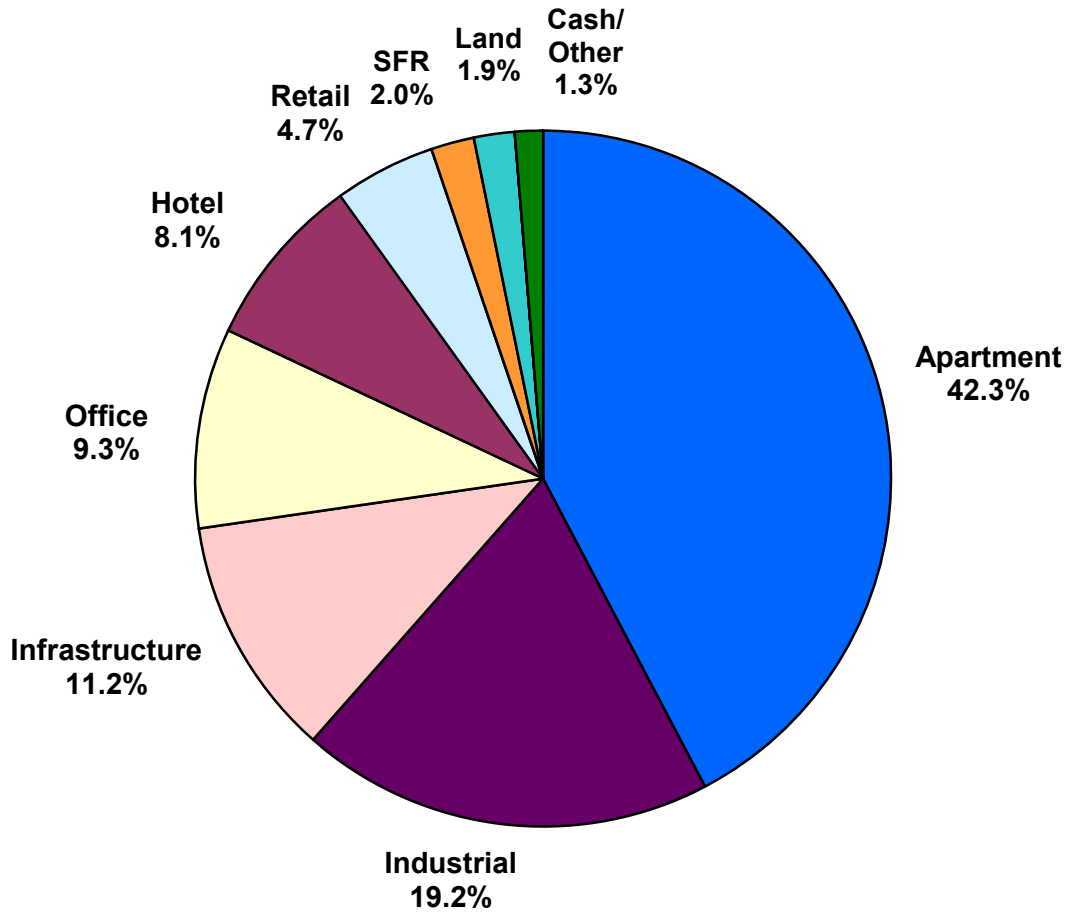
- The COVID-19 global pandemic and Shelter-in-Place orders implemented to slow the spread of the virus resulted in major negative impacts to the US economy and certain segments of the commercial real estate and infrastructure markets. The US economy largely reopened by the end of the second quarter 2021. Subsequent to the end of the quarter resurgent case numbers have resulted in some parts of the country bringing back mitigation measures. Impacts to the commercial markets have been uneven across the real estate and infrastructure sectors. We continue to monitor, assess, and shift strategies, as necessary. Transaction volumes dropped to very low levels during the initial stages of the pandemic and have experienced uneven recovery across sectors. In general volumes remain depressed, down about 7% in aggregate across the primary real estate property types for a rolling 12-month period, ending June 30, 2021. Infrastructure transaction volumes have largely recovered from pandemic lows.
- We are focused on sourcing off-market opportunities through our extensive network and where available reducing risk in the portfolio through early income-generating investments including credit strategies that are higher in the capital stack with a shorter projected hold period. We have selectively acquired properties where we can add value through management and leasing and have continued to develop properties at attractive risk-adjusted returns. The team continues to assemble portfolios in both traditional and non-traditional real estate sectors that we believe will become institutional property types, providing above market appreciation and total returns.
- We have been actively managing the portfolio with capital returned of approximately \$491 million, and funding for new or existing investments of just over \$614 million over the past 12 months.
- The REID has approximately \$2 billion in unfunded commitments. Five new commitments were made during the quarter.
 - \$100 million in Carlyle Realty Partners IX, L.P., a closed-end North American multi-strategy real estate fund, managed by Carlyle Investment Management LLC.

- \$100 million in Heitman Global Real Estate Partners II, L.P., an open-end global core, multi-strategy real estate fund, managed by Heitman Global Real Estate Partners GP, LLC.
- \$100 million in KKR Global Infrastructure Investors IV (USD) SCSp, a closed-end global infrastructure fund investing in diverse segments of the infrastructure market including renewables and digital infrastructure, managed by KKR Alternative Investment Management Unlimited Co.
- \$100 million in Lion Industrial Trust, an open-end vehicle investing in the US industrial real estate sector, managed by Clarion Partners, LLC.
- \$75 million in Transwestern Strategic Partners Fund III, L.P., a closed-end vehicle investing multi-strategy US real estate sector, managed by Transwestern Investment Group.

SMRS

Real Estate and Infrastructure

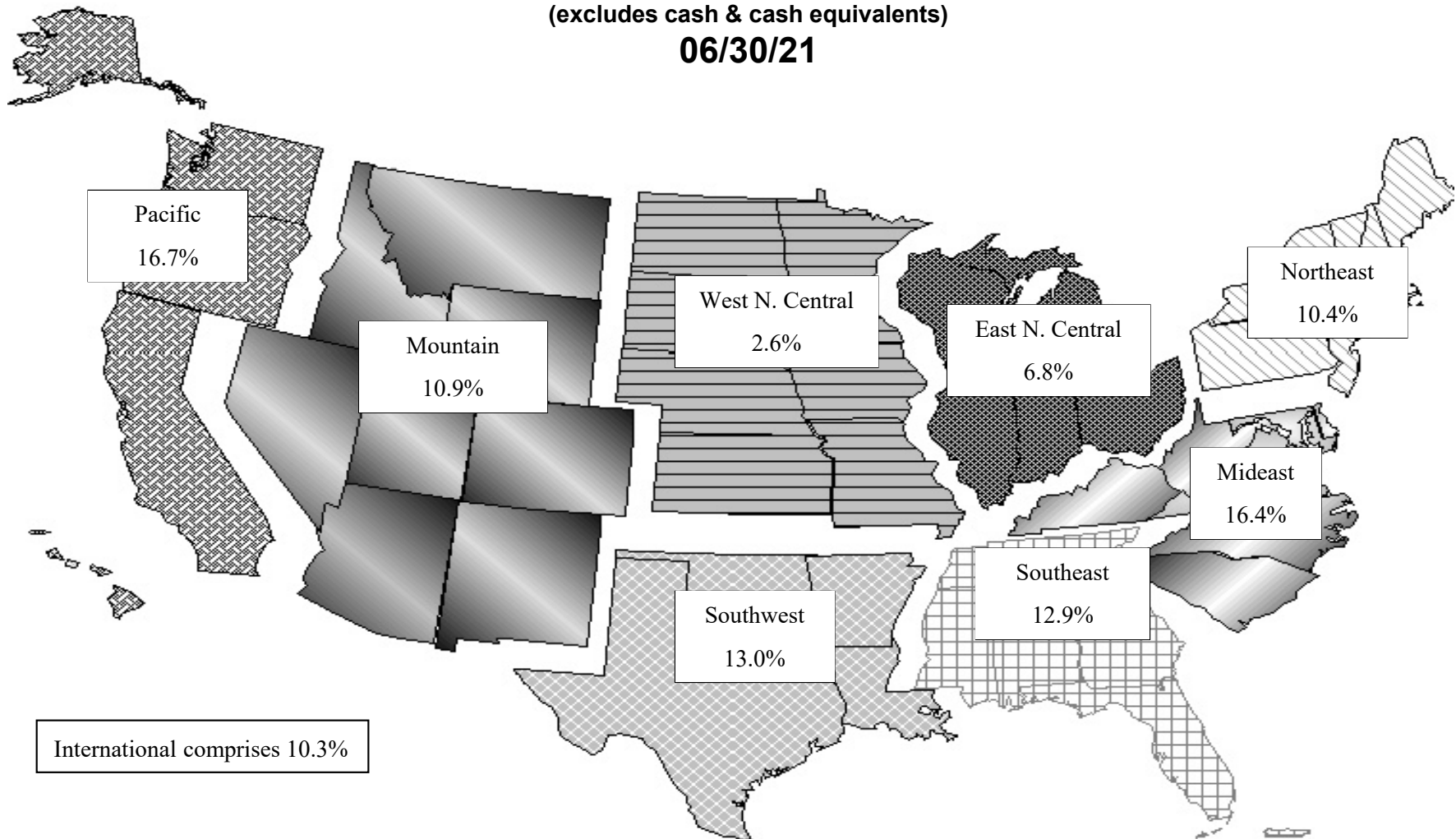
6/30/21



Market Value in Millions

	6/30/21		6/30/20	
Apartment	\$2,693	42.3%	\$2,659	42.2%
Industrial	1,226	19.2%	942	15.0%
Infrastructure	713	11.2%	691	11.0%
Office	592	9.3%	764	12.1%
Hotel	516	8.1%	613	9.7%
Retail	302	4.7%	338	5.4%
Single Family Residential (SFR)	126	2.0%	108	1.7%
Land	121	1.9%	100	1.6%
	<u>\$6,289</u>	<u>98.7%</u>	<u>\$6,215</u>	<u>98.7%</u>
Cash/Other	84	1.3%	80	1.3%
Total Investments	<u>\$6,373</u>	<u>100.0%</u>	<u>\$6,295</u>	<u>100.0%</u>

SMRS
Real Estate by Region
Based on Market Value
(excludes cash & cash equivalents)
06/30/21



Geographic regions defined by NCREIF, whose property index composition is: Pacific 34.1%, Mountain 6.5%, West N. Central 1.1%, Southwest 10.5%, East N. Central 7.0%, Southeast 10.0%, Northeast 19.4%, Mideast 11.4%

SMRS

Real Estate and Infrastructure

6/30/21

Top Ten Advisors or Entity

Advisor or Entity	(\$ in millions)
	Market Value
MWT Holdings LLC	\$ 1,959
Principal Real Estate Investors	709
Clarion Partners	435
Domain Capital Advisors Inc	299
Blackstone Group	263
Five Star Realty Partners LLC	258
Rialto Capital Management LLC	160
L&B Realty Advisors	158
CIM Investment Advisors LLC	149
Transwestern Investment Management	149
Total Market Value	\$ 4,539

Occupancy by Property Type

	Apartment	Office	Industrial	Retail	Hotel
SMRS Portfolio	93.1%	84.6%	96.7%	85.4%	66.9%
National Average	93.2%	84.0%	93.0%	94.9%	53.5%

SMRS

Market Values by Ownership Entity

06/30/21

REAL ESTATE

	Market Value	Unfunded Commitment
801 Grand Avenue Capital, LLC	\$ 58,752,090	\$ 0
AEW Senior Housing III	3,766,484	715,013
AEW Senior Housing Investors IV	22,739,849	26,273,469
Apollo Asia Real Estate Fund	58,674,397	25,751,871
Asana Partners Fund I	30,864,615	2,449,559
Asana Partners Fund II	17,519,325	24,030,405
Avanath Affordable Housing II, LLC	32,891,657	0
Avanath II SMRS Co-Investment Fund LLC	27,565,167	0
Avanath Affordable Housing III	47,997,081	5,311,980
Avanath Affordable Housing IV	8,140,248	25,621,767
BentallGreenOak US Cold Storage LP	0	75,000,000
BGO Europe III Co Invest	7,141,544	22,508,784
Blackstone R/E Partners V, LP	1,742,019	0
Blackstone R/E Partners VI, LP	2,636,298	3,680,930
Blackstone R/E Partners VIII, LP	54,987,782	12,401,273
Blackstone R/E Partners IX, LP	101,011,175	114,191,816
Capri Urban Investors, LLC	5,810,536	0
* Carlyle Realty Partners IX LP	0	100,000,000
CIM Commercial Trust Corp	5,260,040	0
CIM Fund III, LP	30,633,895	0
CIM Fund VIII, L.P.	89,476,536	0
CIM VI (Urban REIT), LLC	23,446,721	0
Clarion Gables Multifamily Trust, LP	31,702,071	0
Columbus Circle Holdings, LLC	198,630,383	118,735,189
Crown Small Cap Real Estate	13,738,767	4,402,500
DM2501, LLC	0	0
Domain GVA-1, LLC	28,327,281	1,940,056
Domain Hotel Properties, LLC	121,760,810	0
Eastport Properties, LLC	0	0
Gateway Capital Real Estate Fund II, LP	670,375	0
Great Lakes Property Group Trust	14,547,394	0
GreenOak Europe III, LP	33,730,747	53,395,964
Heitman Credit	48,265,917	0
* Heitman Global Real Estate Partners II, LP	0	100,000,000
IDR Core Property Index Fund LLC	25,677,119	0
IMRF II CoInvest Spiga LP	33,222	0
India Property Fund II, LLC	16,854,459	1,552,610
Invesco Mortgage Recovery Feeder Fund	1,023,212	0
Invesco Mortgage Recovery Fund II, L.P.	18,203,245	26,390,889
Invesco Strategic Opportunities III, L.P.	24,152,691	82,461,385
IPF II Co-Invest LP	18,486,104	1,270,897
ISO III SMRS Sidecar, LP	30,776,000	4,224,000
JBC Funds North LaSalle LLC	13,401,671	0
JBC Opportunity Fund III, LP	495,673	0
KBS/SM Fund III, LP	1,103,539	0
KBS/SM Fund IV	137,573	0

	Market Value	Unfunded Commitment
L-A Saturn Acquisition	44,715,427	0
Landmark Real Estate Partners V, LP	5,843,373	0
LaSalle Asia Opportunity Fund III, LP	1,227,293	0
* Lion Industrial Trust	277,978,545	100,000,000
Lion Mexico Fund, LP	4,268,888	0
Lombard GVA0016 (former AGL Annuity)	258,492,486	0
Lone Star Fund X LP	108,244,025	21,734,113
Lone Star Fund XI LP	7,581,573	180,916,731
Lubert-Adler Real Estate Fund VII, LP	52,286,343	4,663,662
M1 Westgate ColInvest LLC	512,979	
M301W ColInvest LLC	482,388	0
MERS Acquisitions Ltd.	158,539,145	0
MIP Holdco LLC	112,873,619	5,759,653
MSREF V - International	2,314,443	0
MSRESS Fund III Institutional LP	5,372,929	0
MWT Holdings, LLC	1,959,178,904	0
Northpark Land Associates	37,941,043	1,040,474
Orange Investors LLC	389,421	0
Paladin Realty Brazil Investors III (USA), LP	5,940,404	0
Paladin Realty Latin America Investors IV-CI, LP	25,716,260	0
Paladin Realty TB COINV V LP	9,253,146	0
Penmain Office LLC	35,015,802	0
Principal Separate Account	650,951,070	140,742,656
Proprium RE Spec. Situations Fund, LP	104,529,148	0
Rialto Credit Partshp LP	19,702,292	0
Rialto Real Estate Fund, LP	20,878,900	0
Rialto Real Estate Fund II, LP	23,890,499	0
Rialto Real Estate Fund III-Debt, LP	41,729,737	0
Rialto Real Estate Fund III-Property, LP	38,515,327	0
Rialto Real Estate Fund IV-Debt, LP	16,268,059	85,000,000
SM Brell II LP	18,745,436	0
Stockbridge RE Fund II-C, LP	4,975,593	0
Strategic II LLC	87,112,035	59,938,926
TPG RE Finance Trust Inc. (TRTX)	64,886,055	0
TPG Real Estate Partners II	12,026,706	8,621,383
TPG Real Estate Partners III	21,090,407	29,661,096
* Transwestern Strategic Partners Fund III, LP	0	75,000,000
TSP Spartan C-II LLC	15,992,001	0
TSP Value & Income Fund II, LP	20,367,203	20,119,038
Trophy Property Development LP	188,550	0
True North High Yield Invest. Fund II, LLC	1,575,118	0
True North Real Estate Fund III, LLC	26,455,369	5,000,000
	\$ 5,576,823,648	\$ 1,570,508,090
Short-Term Investments and Other	73,458,835	0
Total Real Estate Investments	\$ 5,650,282,483	\$ 1,570,508,089

* New or additional commitment made during the quarter reported

SMRS
Market Values by Ownership Entity
06/30/21

INFRASTRUCTURE

	Market Value	Unfunded Commitment
Arclight Energy Partners VI, LP	\$ 33,307,704	\$ 7,004,763
Arclight Energy Partners VII, LP	11,282,667	37,655,102
ASF VI Infrastructure B LP	16,467,094	5,992,354
ASF VII Infrastructure Fund B L.P.	20,471,552	12,794,112
ASF Como Co-Investment LP	5,799,522	1,650,827
Basalt Infrastructure Partners, LP	24,659,640	2,219,045
Blackstone Energy Partners, LP	12,576,504	4,728,291
Blackstone Energy Partners II, LP	63,003,183	8,184,851
Brookfield Infrastructure Fund II-B, L.P.	54,471,251	3,119,352
Customized Infrastructure Strategies, LP	11,859,969	4,509,834
Dalmore Capital Fund	68,572,413	0
GCM Grosvenor Infrastructure Investment Program, L.P.	74,306,510	0
GCM Grosvenor Customized Infrastructure Strategies II, L.P.	42,011,559	11,786,100
Global E&P Infrastructure Fund II L.P.	43,635,424	3,525,374
GSO Energy Select Opportunities Fund LP	20,085,088	23,027,260
GSO Energy Select Opportunities Fund II, LP	7,696,499	43,260,908
JPMorgan AIRRO India SideCar Fund US, LLC	78,143,311	1,103,288
JPMorgan AIRRO Fund II	10,226,273	7,013,452
Kayne Renewable Opportunities Partners, LP	10,969,754	91,223,843
KKR Eagle CoInvest L.P.	34,179,634	1,853,268
KKR Global Infrastructure Investors, LP	148,697	2,806,054
* KKR Global Infrastructure Investors IV, LP	0	100,000,000
Ridgewood Water & Strategic Infrastructure Fund LP	13,243,926	33,490,785
RPEP SMRS Infra II, LLC	13,667,102	3,469,723
StonePeak Infrastructure Fund LP	41,926,254	9,456,616
	<hr/>	<hr/>
	\$ 712,711,529	\$ 419,875,202
Short-Term Investments and Other	10,055,688	0
	<hr/>	<hr/>
Total Infrastructure Investments	\$ 722,767,217	\$ 419,875,202
	<hr/>	<hr/>
TOTAL INVESTMENTS	\$ 6,373,049,700	\$ 1,990,383,291
	<hr/>	<hr/>

* New or additional commitment made during the quarter reported

State of Michigan Retirement System

FIXED INCOME REVIEW

State of Michigan Investment Board Meeting

September 16, 2021



Daniel J. Quigley
Senior Investment Manager
Fixed Income Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	5.4%	5.7%	4.5%	4.4%	4.4%
Bloomberg Barclays US Agg	-0.3%	5.3%	3.0%	3.3%	3.4%
Peer Median Returns	0.8%	5.8%	3.9%	3.8%	4.1%
Percentile Rank vs. Peers*	17	59	32	21	38

*State Street Universe greater than \$1 billion

- The fixed income portfolio outperformed its benchmark and peer group on a one-year basis. This outperformance was driven by a recovery in risk assets over the previous fifteen months, particularly for the structured fixed income allocation in the portfolio. The portfolio also maintains a shorter duration than the benchmark which has helped recent performance as interest rates have increased over the past year.
- The negative performance of the U.S. Aggregate Bond Index on a one-year basis was driven by the increase in intermediate and long-term interest rates. U.S. Treasuries and RMBS had a negative performance on a one-year basis while Investment Grade Corporate Bonds outperformed as credit spread tightening helped to offset any interest rate related price declines.
- The year-over-year (YOY) tightening of spreads for high yield credit and structured credit securities was the main driver of performance on a one-year basis. The Structured Fixed Income sleeve of the portfolio had a one-year return of 11.2% while the High Yield Credit sleeve returned 14.0% on a year-over-year (YOY) basis.

Strategy Update

- The objective of the Fixed Income Division portfolio is to meet or exceed the returns of the Bloomberg U.S. Aggregate Bond Index while satisfying the overall characteristics of a core fixed income portfolio. These characteristics are: income, liquidity, principal preservation, and diversification from equity market risk. The portfolio has a higher yield than the benchmark while having a risk profile that is similar to the long-term volatility experienced in traditional core fixed income. The yield-to-maturity of the portfolio is currently 2.9% versus a benchmark yield of 1.5%. In addition to this, the portfolio exhibits risk characteristics that are in line with the historical volatility of traditional fixed income benchmarks and has an equity beta of 0.1.
- The Core-plus strategy implemented to achieve this goal includes:
 - Core: As of June 30, 2021, the portfolio's allocation to U.S. Treasuries, Investment Grade corporate bonds, government-guaranteed U.S. Agency Debentures, RMBS, and Commercial Mortgage Backed Securities (CMBS) was 61.6%. This includes a 21.8% allocation to U.S. Treasuries, TIPS, and cash.
 - Plus: The portfolio maintains a strategic out-of-benchmark allocation to high-yield corporate debt, securitized credit, and global fixed income strategies as market opportunities allow. This allocation increases the portfolio yield and total return potential but results in lower liquidity and higher volatility. The allocation to the Plus portfolio was 38.4% as of June 30, 2021.

Tactical Update

- The allocation to securitized credit, primarily in CMBS, ABS, non-agency RMBS, and CLO securities, was 27.5% of the portfolio at the end of the quarter. The combination of low interest rate duration and high coupon income (often floating rate) offers attractive characteristics for the overall fixed income portfolio in this low interest rate environment. This portion of the portfolio experienced large mark-to-market losses in the first quarter of 2020 but has recovered meaningfully since that selloff. The one-year return on this portfolio was 11.2%.
- The allocation to high-yield strategies was 5.4% at the end of the quarter. This out-of-benchmark position has outperformed for the quarter and on a one-year basis. This has been driven by credit spread compression as well as having a shorter interest rate duration than the benchmark in a rising interest rate environment. The one-year performance of this allocation was 14.0%, outperforming the core index by over 1,400 basis points (bps).
- The portfolio has a meaningful allocation to floating rate securities, including AAA CLO investments and investment-grade floating rate corporate bonds. This allocation accounts for approximately 15% of portfolio assets. This allocation will underperform during risk-off markets when interest rates decline, however, it should exhibit strong risk-adjusted return characteristics on a go forward basis in this low interest rate environment.
- We exited our allocation to U.S. TIPS during the first quarter. This exit occurred as breakeven inflation expectations reached their highest levels in the past eight years. Ten-year breakeven expectations ended the quarter at 2.4%. The TIPS allocation has outperformed nominal U.S. Treasuries by roughly 900 bps for the previous year. We will continue to monitor inflation expectations and may increase our allocation if valuation levels move closer to historical averages.

Market Environment and Outlook

- The yield curve for U.S. Treasury securities flattened during the quarter, reversing a one-year steepening trend as short-term interest rates increased while long-term rates declined. Three-month U.S. Treasury Bills increased by 2 bps to 0.04% during the quarter while ten-year U.S. Treasuries declined by 27 bps to 1.47%.
- Inflation expectations were relatively flat for the quarter with ten-year breakeven inflation ending the quarter at 2.35%, down 2 bps for the quarter.
- Credit markets continued to recover during the quarter with high yield corporate bond spreads tightening by 42 bps to 268 bps at the end of the quarter. High yield spreads are roughly 95 bps below their five-year average. Investment grade corporate bond spreads also tightened during the quarter, decreasing by 11 bps to 80 bps.
- Emerging Markets credit spreads declined during the quarter, tightening by 10 bps to 269 bps and was relatively flat during the quarter with spreads decreasing by 2 bps to 279 bps. Emerging markets spreads are 139 bps tighter for the previous twelve months.
- The recovery of Commercial Mortgage Backed Securities (CMBS) was strong as securitized assets outperformed corporate credit last quarter. BBB CMBS spreads declined by 61 bps during the quarter to 275 bps. These spreads are 465 bps tighter YOY.

Conclusion

- The portfolio currently has a slight underweight to interest rate duration versus the benchmark and remains overweight to corporate and structured debt securities. This positioning increases the income of the portfolio while also increasing the potential for price volatility. The portfolio will continue to look for attractive risk-adjusted opportunities within the fixed income opportunity set.

SMRS

Fixed Income by Strategy

6/30/21

	Amount	Total	% of Total
Core (\$ in Millions)			
FID Internal	\$4,832		
PIMCO Mortgage Fund	593		
PGIM Investment Grade Credit	232		
Total Core		\$5,658	58.8%
Tactical			
Fidelity Tactical	\$527		
Total Tactical		\$527	5.5%
Securitized Debt			
TICP CLO Debt	\$820		
Met West Securitized Ops	518		
Principal CMBS	452		
Fortress Credit ABI	367		
Napier Park ABS Income	274		
Putnam DMS	153		
Napier Park Strategic Loan	63		
Total Securitized Debt		\$2,647	27.5%
High Yield			
PGIM High Yield	\$246		
Columbia Management	221		
Crescent Direct Lending	51		
Total High Yield		\$518	5.4%
Global			
T. Rowe Global Multi-Sector	\$267		
Total Global		\$267	2.8%

TOTAL

\$9,616

100.0%

NOTE: Totals may not be exact due to rounding.

SMRS

Fixed Income Holdings Portfolio Characteristics

Benchmark: Barclays Aggregate

6/30/21

Characteristic	Portfolio	Benchmark
Average Maturity (Yrs)	8.4	8.4
Duration (Yrs)	5.5	6.6
Spread Duration (Yrs)	6.2	6.6
Coupon (%)	3.2	2.6
Yield to Maturity (%)	2.9	1.5
Credit Rating	A	AA
VaR (%)	6.8	6.3
Tracking Error (%)	3.2	NA
Beta (vs S&P 500)	0.08	-0.01

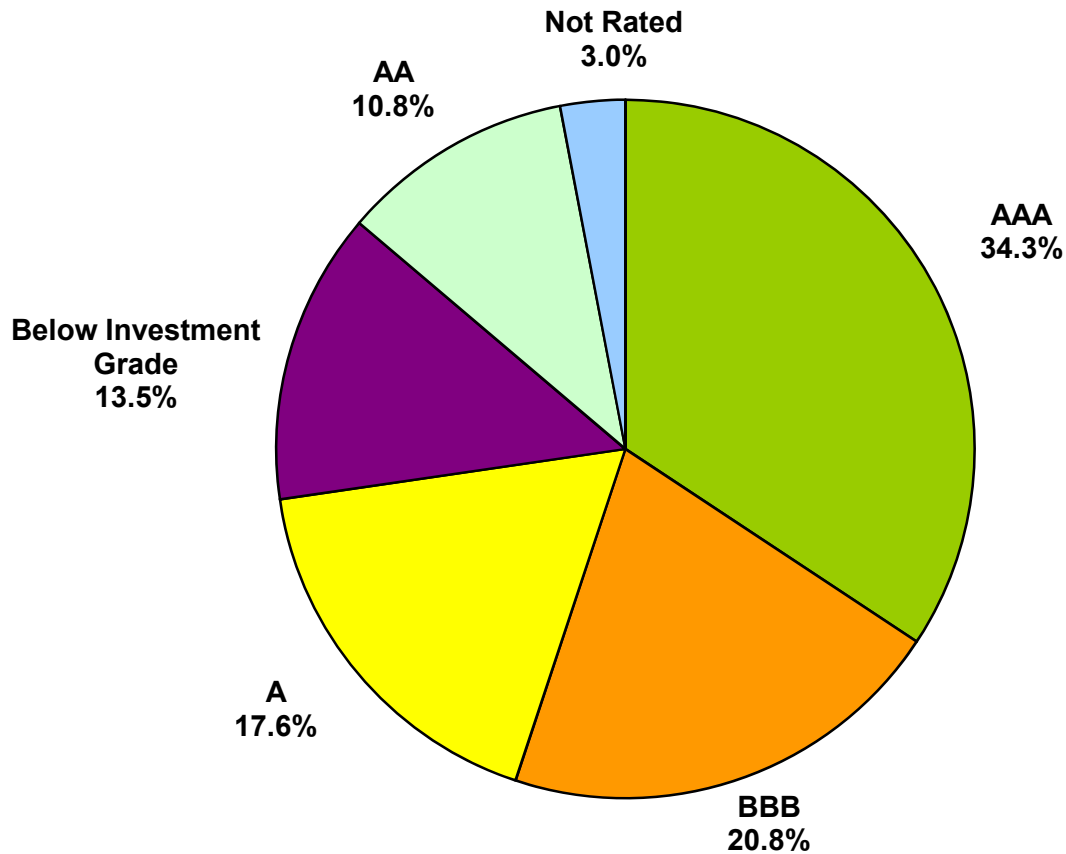
Commentary

<u>Objectives</u>	<u>Highlights</u>
Income:	The coupon of the portfolio is approximately 60 bps higher than the benchmark. Price movement has been the main driver of U.S. bond market returns for the year, but Income is the primary driver of long-term performance.
Liquidity:	21.8% of the portfolio is invested in cash, U.S. Treasuries, and TIPS. These investments can be liquidated via same-day trading.
Principal Preservation:	The portfolio has a large allocation to U.S. Treasuries and carries an investment-grade credit rating.
Diversification:	The equity beta of the portfolio is roughly 0.1 meaning that the portfolio returns have a low correlation with equity market movements.

SMRS

Fixed Income By Rating

6/30/21



Market Value in Millions				
6/30/21				
	Assets	Percent	Benchmark	Difference
AAA	\$3,302	34.3%	68.7%	-34.4%
AA	1,036	10.8%	3.2%	7.6%
A	1,691	17.6%	11.2%	6.4%
BBB	2,006	20.8%	13.8%	7.0%
* Below Investment Grade	1,296	13.5%	0.4%	13.1%
Not Rated	285	3.0%	2.7%	0.3%
Total Investments	\$9,616	100.0%	100.0%	

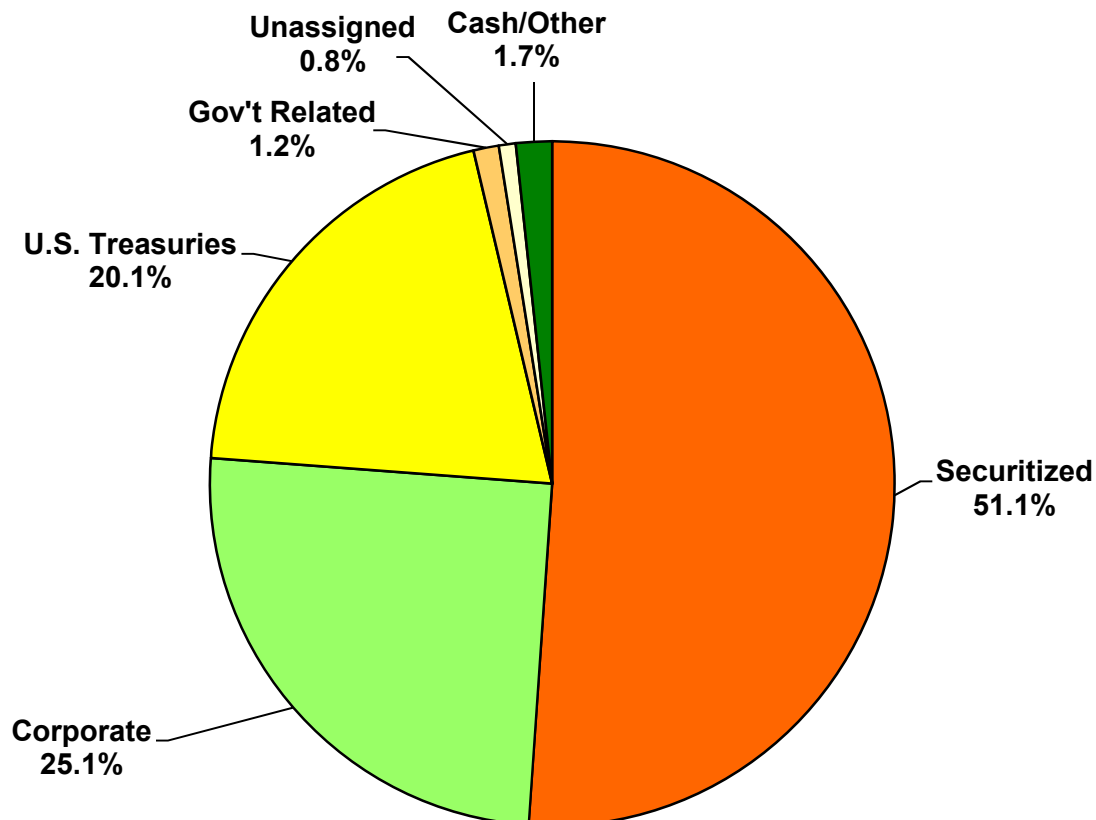
* Comprised of approximately 8.7% High Yield Credit and 4.9% High Yield RMBS/ABS

Benchmark: Barclays US Aggregate

SMRS

Fixed Income By Asset Type

6/30/21



Market Value in Millions				
6/30/21				
	Assets	Percent	Benchmark	Difference
Securitized	\$4,915	51.1%	30.0%	21.1%
Corporate	2,419	25.1%	26.4%	-1.3%
U.S. Treasuries	1,932	20.1%	37.5%	-17.4%
Government Related	115	1.2%	0.0%	1.2%
Unassigned	73	0.8%	6.1%	-5.3%
Cash/Other	162	1.7%	0.0%	1.7%
Total Investments	\$9,616	100.0%	100.0%	

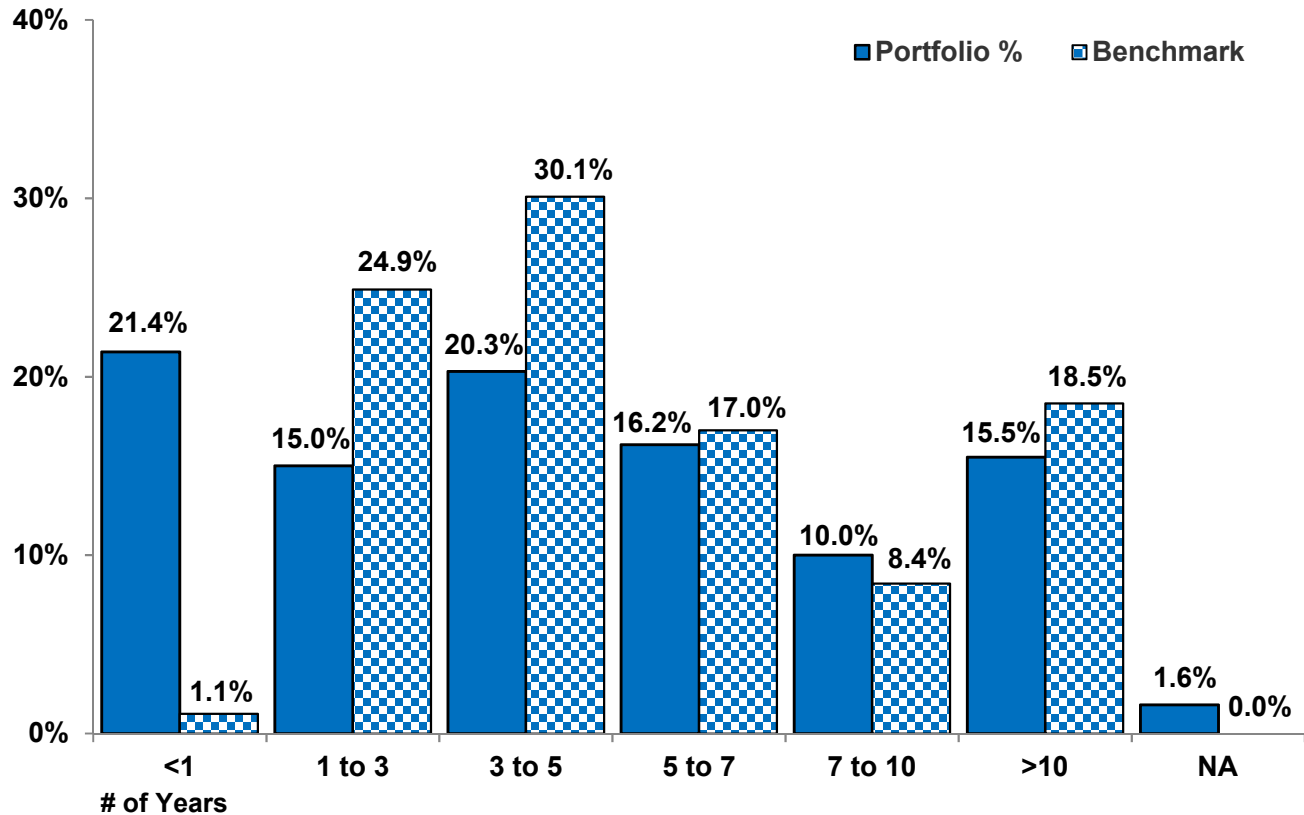
Benchmark: Barclays US Aggregate

SMRS

Duration Distribution

Fixed Income Composite Versus Benchmark

6/30/21



Source: Factset

Market Value in Millions					
Duration	Assets	Portfolio Weight	Benchmark Weight	Portfolio Duration*	Benchmark Duration*
<1	\$2,058	21.4%	1.1%	0.1	0.9
1 to 3	1,442	15.0%	24.9%	2.3	2.1
3 to 5	1,953	20.3%	30.1%	4.1	3.9
5 to 7	1,558	16.2%	17.0%	5.9	6.0
7 to 10	966	10.0%	8.4%	8.3	8.2
>10	1,489	15.5%	18.5%	18.2	16.9
NA	150	1.6%	0.0%	0.0	4.0
Total	\$9,616	100.0%	100.0%	5.7	6.6

* Effective Duration

Benchmark: Barclays US Aggregate

Total Fixed Income Performance - Net of Fees (MPERS)

6/30/21

	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>10-Years</u>
Total Fixed Income	\$9,616,468,055	5.12%	5.45%	4.25%	4.22%	4.20%
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>-0.33%</i>	<i>5.34%</i>	<i>3.03%</i>	<i>3.28%</i>	<i>3.39%</i>
Internal Core Fixed Income	\$4,831,783,432	0.96%	5.81%	3.89%	4.17%	3.99%
Externally Managed Fixed Income	\$4,784,684,623	9.05%	4.93%	4.81%	4.25%	4.62%
PIMCO Mortgage Fund	593,409,949	-0.82%	3.92%			
<i>Bloomberg/Barclays US MBS Agg Fixed Indx</i>	<i>N/A</i>	<i>-0.09%</i>	<i>3.75%</i>			
Investment Grade Credit	\$232,491,476	5.26%	8.36%	5.40%	5.13%	5.51%
PGIM Investment Grade	232,491,476	5.26%	8.36%	5.40%	5.13%	5.61%
<i>Bloomberg/Barclays Credit Index</i>	<i>N/A</i>	<i>2.99%</i>	<i>7.42%</i>	<i>4.63%</i>	<i>4.51%</i>	<i>4.92%</i>
Tactical Fixed Income	\$526,710,950	7.20%	7.00%	5.64%	4.79%	5.96%
Fidelity Tactical Bond Fund	526,710,950	7.20%	7.37%	5.87%	5.45%	
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>-0.33%</i>	<i>5.34%</i>	<i>3.03%</i>	<i>3.28%</i>	<i>3.39%</i>
High Yield Fixed Income	\$518,028,548	14.02%	8.20%	7.24%	5.85%	
Columbia Management High Yield	220,857,147	12.54%	7.72%	6.71%	5.53%	
PGIM High Yield	246,408,241	16.32%	9.03%	8.05%	6.36%	
Crescent Direct Lending	50,763,161	10.06%	6.01%			
<i>Bloomberg/Barclays US HY BA/B 2% Cap</i>	<i>N/A</i>	<i>13.37%</i>	<i>7.96%</i>	<i>7.28%</i>	<i>5.54%</i>	
Structured Fixed Income	\$2,647,035,465	11.23%	3.64%			
Principal CMBS	451,982,714	18.55%	5.57%	4.98%	4.52%	6.04%
MetWest Securitized Opportunities	517,583,255	6.02%	4.05%	5.04%	3.94%	
Napier Park ABS Income	273,641,186	38.18%	9.82%	10.64%		
Napier Park Strategic Loan LP	63,269,975	2.79%	3.73%			
TICP CLO Debt	820,498,233	11.99%	6.14%			
Fortress ABI	366,883,235	19.91%				
Putnam DMS	153,176,866	6.93%				
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>-0.33%</i>	<i>5.34%</i>	<i>3.03%</i>	<i>3.28%</i>	<i>3.39%</i>
<i>Blended CMBS Benchmark</i>	<i>N/A</i>	<i>2.94%</i>	<i>5.92%</i>	<i>3.18%</i>	<i>4.17%</i>	<i>5.27%</i>
Global Fixed Income	\$267,008,235	4.92%	5.15%	4.38%		
T. Rowe Global Multi-Sector	267,008,235	6.45%	5.94%	4.73%		
<i>Custom GMS Benchmark</i>	<i>N/A</i>	<i>3.79%</i>	<i>5.71%</i>	<i>4.30%</i>		

State of Michigan Retirement System

ABSOLUTE RETURN REVIEW

State of Michigan Investment Board Meeting
September 16, 2021



Daniel J. Quigley
Senior Investment Manager
Absolute Return Strategy

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Absolute Return	19.1%	6.9%	6.9%	5.1%	5.5%
HFRI FOF Conservative	16.6%	5.2%	4.9%	3.5%	3.4%

- The value of the Absolute Return portfolio is \$4.8 billion with a one-year return of 19.1%. Performance of the portfolio was positive for the second quarter across all strategies, driven by manager selection and exposure to Multi-Strategy and Credit strategies.
- Multi-Strategy and Event strategies were the largest contributors to performance for the quarter. Core Multi-Strategy managers with low volatility, high Sharpe ratios and low beta profiles drove performance across asset classes, including equity activism, distressed credit and fixed income relative value. Some of the top contributors to performance within the Multi-Strategy allocation included strong performance in a hedge fund seeding fund as underlying managers continued to raise capital and generate strong returns. Special Situations vehicles also contributed positively, driven by a structured investment in a healthcare company, capital markets activity, and growth equity investments. Overall, Multi-Strategy managers served as effective diversifiers and reliable sources of alpha for the portfolio this quarter.
- Credit strategies also drove strong performance in the quarter. Residential mortgage managers posted positive returns as structured credit spreads were broadly tighter. Residential mortgage markets specifically have been supported by strong housing price appreciation and a continued decline in forbearance levels. Corporate credit managers also performed well as lower-rated and COVID-impacted credits continued to outperform the overall high yield and loan indices.

Strategy Update

- The objective of the Absolute Return portfolio is to diversify the total plans' holdings, targeting returns above investment-grade fixed income with lower volatility than the equity portfolio. The portfolio utilizes a diverse mix of managers that invest both long and short to target specific exposures and seek to hedge out unwanted risk.
- Commitments closed during the quarter include:
 - \$150 million Acacia - an equity co-investment with Sixth Street Partners in a seasoned and diversified insurance business.
 - \$100 million PIMCO Aviation Co-Invest Vehicle Onshore Feeder, L.P. - an aircraft leasing joint venture investment vehicle created by PIMCO and GECAS.

In terms of allocation priorities, we will continue to review a broad array of investment strategies with the goal of achieving a strong risk-adjusted return, a low equity beta profile, and a relative return in excess of the portfolio benchmark. Overall, we will continue to focus on opportunities that seek to provide diversification, protect the downside and deliver absolute return.

SMRS Absolute Return 6/30/21

Net Market Values by Entity

	Net Market Value	Undrawn Commitment
* Tahquamenon Fund, LP	\$ 3,918,211,244	\$ 0
** Acacia Co-Invest, LP	150,318,907	0
Cerberus Manitou Residential Loan Fund, LP	146,692,984	86,000,000
PGIM Global Liquid Rel Val	111,921,820	0
JM IV, LP	91,245,372	20,933,161
SJC Direct Lending Revolver Fund III, LP	85,274,343	14,725,657
AG Essential Housing, LP	82,294,078	133,000,000
Kayne CLO Partners Fund II	51,181,362	49,350,402
Kayne Anderson BDC, Inc	41,968,714	58,031,286
MP Securitized Credit Master Fund, LP	16,254,267	0
* EnTrust White Pine Partners, LP	14,406,060	0
Monument Park, LLC	0	0
** PIMCO Aviation Co-Invest Vehicle Onshore Feeder, LP	0	100,000,000
Total Absolute Return Strategies	\$ 4,709,769,152	\$ 462,040,506
Short-Term Investments & Other	100,022,356	0
Grand Total	\$ 4,809,791,508	\$ 462,040,506

* Fund of Funds

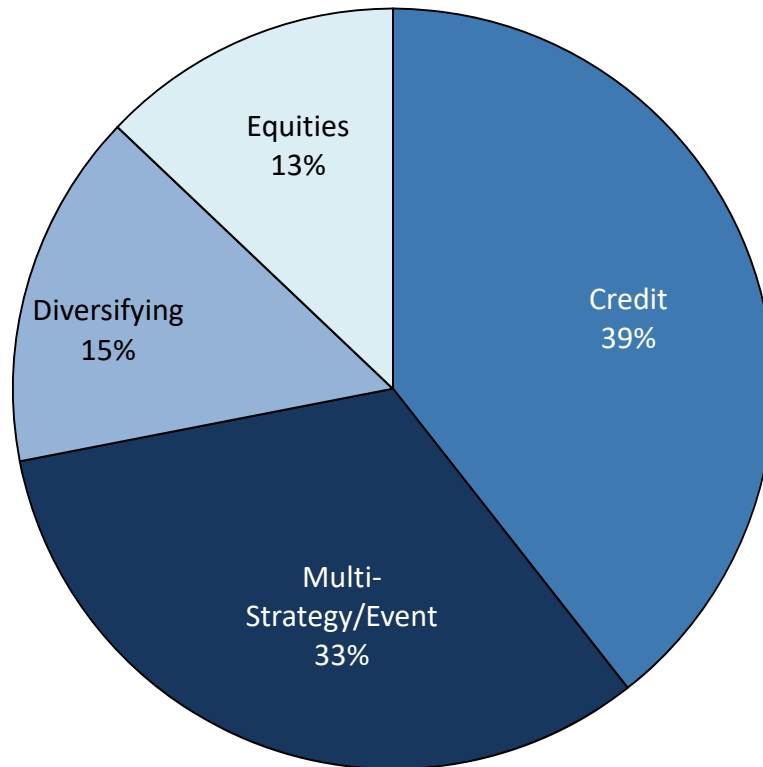
** New Commitment

SMRS

Absolute Return

6/30/21

Investments By Strategy



Strategy Breakdown			
Underlying Funds:	77	Median Position Size:	0.7%
Strategies:	4	Average Position Size:	1.3%
Relationships:	13	Largest Position Size:	7.6%

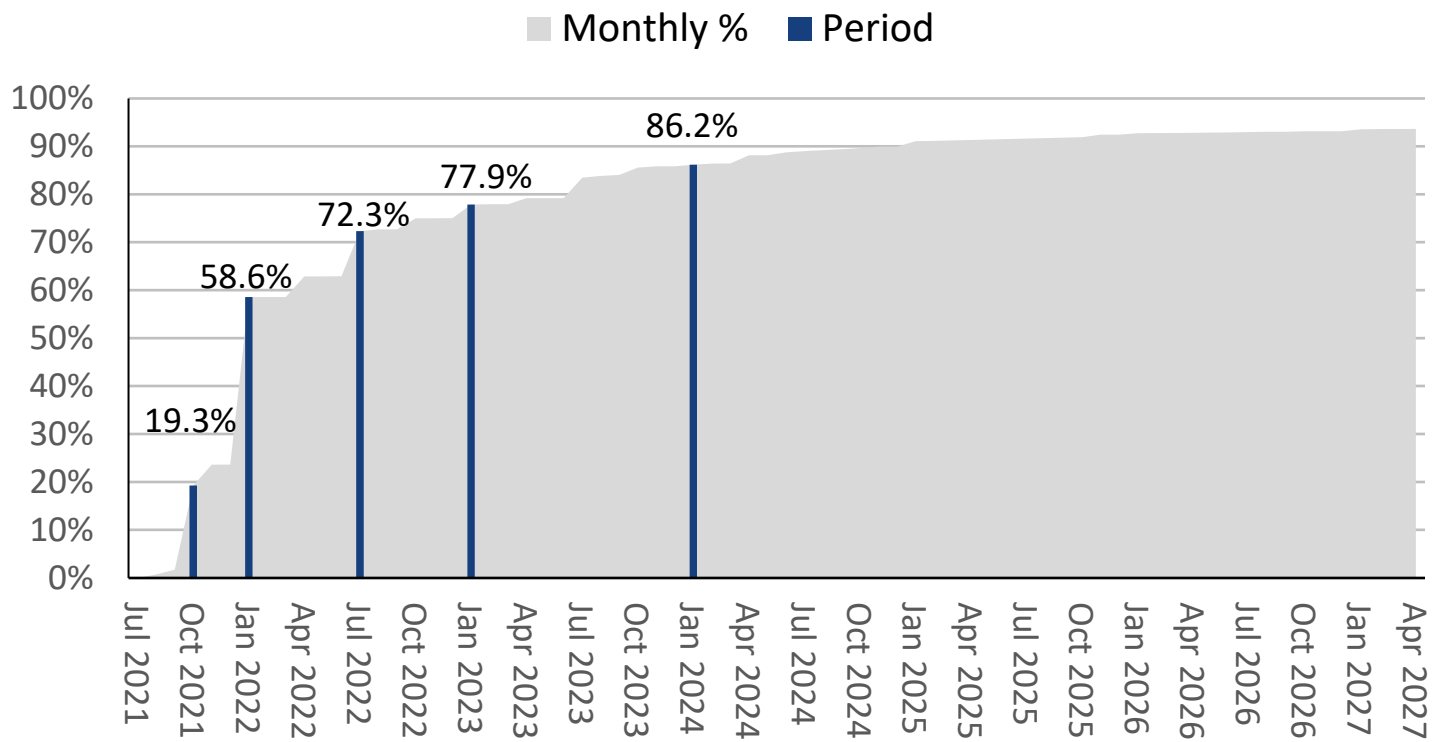
SMRS

Absolute Return

6/30/21

Liquidity Analysis

Redeemable	Marginal Allocation (% each period)	Aggregate Allocation (% since Analysis Date)
By 10/1/21	19.30%	19.30%
By 1/1/22	39.30%	58.60%
By 7/1/22	13.70%	72.30%
By 1/1/23	5.60%	77.90%
After 1/1/24	8.30%	86.20%
Illiquid	13.80%	100.00%
Total	100.00%	N/A



State of Michigan Retirement System

DEFINED CONTRIBUTION REVIEW

State of Michigan Investment Board Meeting
September 16, 2021



Woodrow S. Tyler
Senior Investment Manager
Defined Contribution, Trusts & Agencies Division

EXECUTIVE SUMMARY

Overview

Defined Contribution (DC) plans are participant led investments. The role of the Bureau of Investments is to offer a sufficient range of investment options which will allow participants enough choice to diversify their individual retirement accounts and construct portfolios that reasonably span the risk/return spectrum. To this end, the Plans may be comprised of at least one investment option from the categories below.

Investments Options

Tier I: Target Date Funds and Passively Managed Index Funds

- Target Date Funds (TDFs) are the default option for plan participants. Each TDF seeks to achieve its objective by investing in a set of underlying index funds representing various asset classes. Over time, the allocation to asset classes and funds change according to a predetermined "glide path" which will become more conservative as it approaches the target retirement date.
- Passively Managed Index Funds are comprised of low-cost index funds which seek to replicate the performance of a variety of cash, bond and stock indices with very little tracking error and at a low fee.

Tier II: Actively Managed Funds

- These are funds actively managed by investment managers in an attempt to outperform various cash, bond and stock indices over the long term (5+ years).

Tier III: Self Directed Brokerage Account – Non-Core Options

- TD Ameritrade provides access to a broad range of investment choices including individual stocks, bonds, CDs, over 100 commission-free ETFs, and more than 13,000 mutual funds—including more than 2,100 no-load, no-transaction-fee (NTF) mutual funds.

SOM Plans	6/30/21	6/30/20
State of Michigan 401(k)	\$8,606	\$6,644
State of Michigan 457	2,084	1,775
Pension Plus 401(k) & 457	1,696	1,082
EAA	13	10
Total	\$12,400	\$9,512

(\$ in millions)

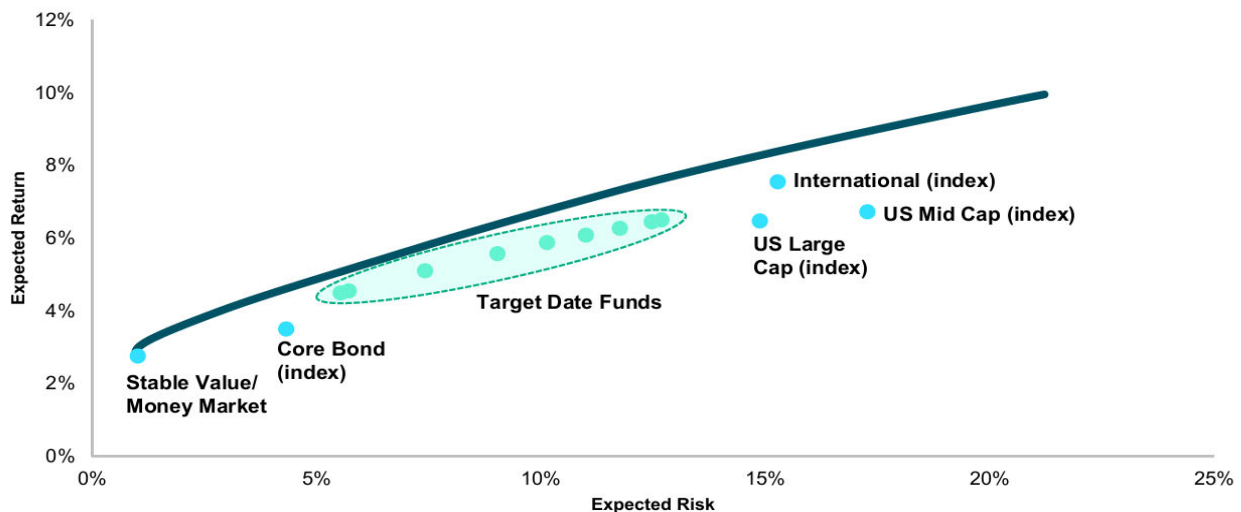
Investment Selection

- The selection of each investment option for the Plans is based on the prudence standards set by the Governing Documents and applicable law, with flexibility built-in to allow a search to take full advantage of strategic opportunities. The search will focus on finding opportunities which are tailored to the Plans' specific needs. The BOI, in consultation with the Office of Retirement Services (ORS), will establish search criteria that aligns with the

purpose and objective an investment option is seeking to attain. Due diligence will be completed with the goal of selecting a plan that, in the totality of circumstances, offers fair and reasonable investment options for the Plan participants.

- With respect to Tier III investments, the universe of available options is extensive. Since the selection of investments is directed solely by the participants which elect the Tier III option, the State does not provide any criteria for selecting or monitoring these non-core investment options.

Michigan DC Plan Efficient Frontier
Target Date & Select Core Funds Plotted



Source: State Street analysis based on information provided by plan sponsor, as of April 2019.

Market Environment and Outlook

The U.S. has made significant progress in combating COVID-19 according to data from the Centers for Disease Prevention and Control (CDC), with over 54% of the total US population, or 180 million people, having received at least one dose of a vaccine. Although there are worries about the highly transmissible Delta variant, it appears fully vaccinated people have a high degree of protection against it.

This has helped with the economic recovery as the U.S. real economic growth rate was 6.4% in the first quarter of 2021, and 6.5% in the second quarter. Signs of inflation have picked up with the good economic news, as supply in some areas has had trouble keeping up with demand. As a result, inflation has risen to nearly twice the Federal Reserve's 2% target. However, Federal officials expect this level of inflation to be transitory and will diminish as the economy gets back to normal and widespread labor and supply shortages fade over time.

Market reactions have been favorable during the second quarter as stocks rose in nearly all major markets while interest rates, which rose significantly in the first quarter, actually dropped during the second quarter.

For the quarter, the S&P 500 increased 8.2% while the Nasdaq was up 9.5%. For the first half of the year, the S&P 500 rose 14.4%, while the Nasdaq Composite gained 12.5% and the Russell 2000 index advanced 17%.

The yield on the 10-year Treasury note is sending a different signal about the prospects for longer-term growth, indicating it may not be as strong for as long as anticipated. The Benchmark note ended the second quarter with a yield of 1.44%, which is down from the closing high of 1.75% in late March of this year but still up from a low of 0.91% in early January.

DC Plan news on SECURE Act 2.0

The House Ways and Means Committee is considering a bill called the Securing a Strong Retirement Act of 2021. This comes less than a year and a half after passage of another major retirement savings bill called the SECURE Act of 2019 and it is meant to build upon several of its ideas.

This bill has broad bipartisan support and is expected to pass later this year. Several of the key provisions in the bill:

- **Treatment of student loan payments as elective deferrals for purposes of matching contributions-** an employer under the bill would be permitted to make matching contributions under a 401 (k) or 403 (b) plan, to “qualified student loan payments”. The idea is that employees who are overwhelmed with student debt may not realistically be able to save for retirement.
- **Enhancement of 403(b) plans-** these plans have been generally limited to annuity contracts and mutual funds. Under the legislation, these plans would be permitted to invest in collective investment trusts.
- **Increase in age for required beginning date for mandatory distribution-** under current law, participants are generally required to begin taking distributions from their retirement plans at age 72. The legislation would increase the required minimum distribution age further to 75.
- **Higher catch-up contribution to apply at age 60-** the limit on catch-up contributions for 2020 is \$6,500, except in the case of SIMPLE plans, which is \$3,000. The legislation would increase these limits to \$10,000 and \$5,000.
- **Remove required minimum distribution barriers for life annuities-** the legislation would eliminate certain barriers to the availability of life annuities in qualified plans and IRAs.
- **Qualifying longevity annuity contracts-** qualifying longevity annuity contracts (QLACs) have been limited to no more than 25% of investment or \$135,000. Now the 25% limit has been eliminated and the \$135,000 has been increased to \$200,000.

SMRS
Defined Contribution Strategies
6/30/21

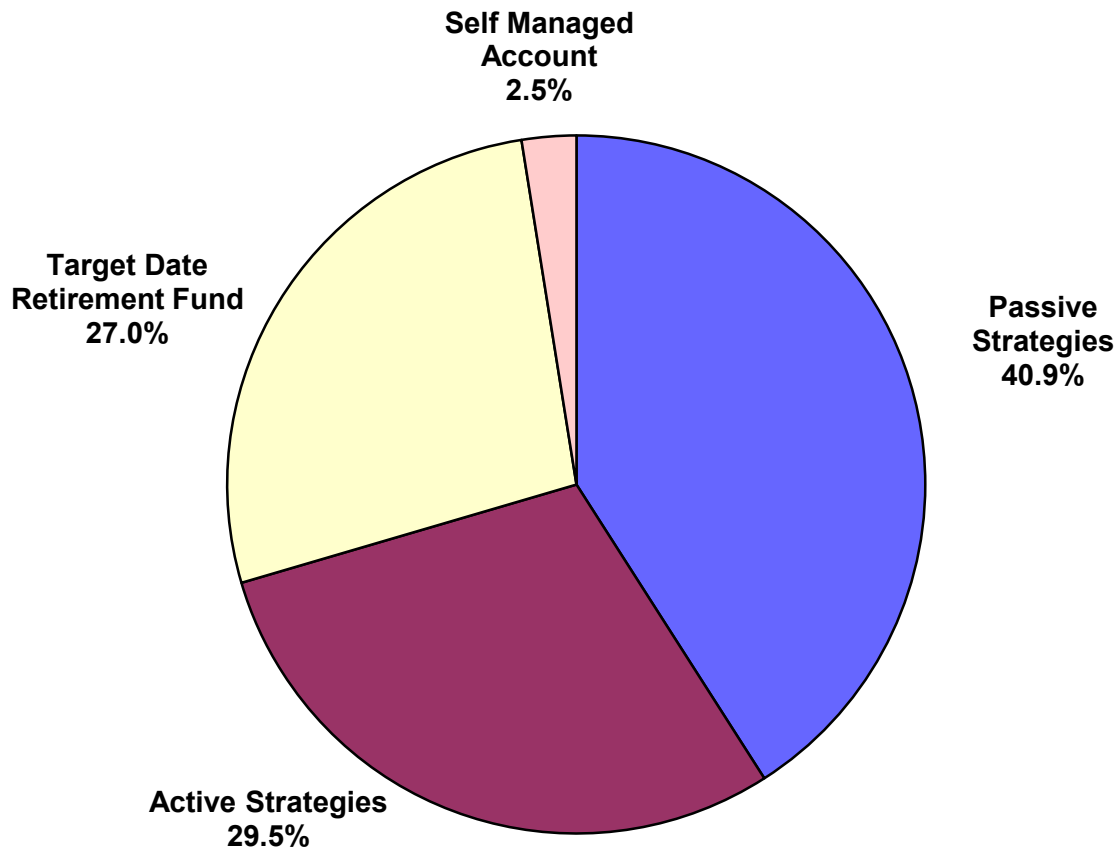
Markets	Amount		% of Total	Fee per \$1,000
QDIA (\$ in Millions)				
	<u>6/30/21</u>	<u>6/30/20</u>		
Total Target Date Fund	\$3,351	\$2,274	27.0%	\$0.70
Tier I Index Funds				
State Street S&P 500 Index Fund	\$1,777	\$1,334		\$0.13
State Street Bond Market Index Fund	\$1,102	950		0.20
State Street Global All Cap Equity ex-U.S. Index Fund	\$870	655		0.45
State Street S&P Mid Cap Index Fund	\$771	553		0.20
BlackRock Government Short-Term Investment CL F	\$223	245		0.56
BlackRock S&P Small Cap 600 Equity Index CL F	\$187	118		0.30
BlackRock Emerging Markets Index CL F	\$147	114		0.69
Total Tier I Index	\$5,077	\$3,969	40.9%	\$0.25
Tier II Active Funds				
Stable Value Fund	\$1,234	\$1,210		\$2.22
Dodge & Cox Stock Fund	\$697	483		4.15
Jennison Large Cap Growth Fund	\$612	486		2.83
American Funds EuroPacific Growth R6	\$362	293		4.60
Artisan Mid Cap Fund	\$186	148		6.63
Voya Small Cap Growth Equity Fund	\$175	135		3.30
T. Rowe Price Mid-Cap Value Fund	\$150	99		6.30
PIMCO Total Return I Fund	\$123	126		7.00
Virtus Ceredex Small-Cap Value Eq I	\$76	52		6.80
Prudential High Yield Fund	\$46	31		3.80
Oakmark Equity & Income I	\$0	0		0.00
Total Tier II Active	\$3,659	\$3,062	29.5%	\$3.64
Tier III				
Total Self Directed Brokerage Account	\$311	\$208	2.5%	NA
Total Defined Contribution Assets	\$12,400	\$9,512	100.0%	\$1.37

NOTE: Totals may not be exact due to rounding.

SMRS

Defined Contribution by Investment Strategy

6/30/21



Market Value in Millions

	6/30/21		6/30/20	
Passive Strategies	\$5,077	40.9%	\$3,969	41.7%
Active Strategies	3,659	29.5%	3,061	32.2%
Target Date Retirement Fund	3,352	27.0%	2,274	23.9%
Self Managed Account	311	2.5%	208	2.2%
Total Investments	<u>\$12,400</u>	<u>100.0%</u>	<u>\$9,512</u>	<u>100.0%</u>

*Loan Fund \$197M as of 6/30/21

Note: Totals may not be exact due to rounding.

Defined Contribution Performance by Fund

6/30/21

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
State Street Target Retirement Income Fund	\$128,145,598	15.4	8.4	6.9	5.6
State Street Income Custom Index		15.5	8.3	6.9	5.6
Morningstar Target-Date Retirement		12.5	7.4	6.3	5.2
<i>Variance State Street Income Custom Index</i>		(0.1)	0.1	0.0	0.0
<i>Variance Morningstar Target-Date Retirement</i>		2.9	1.0	0.6	0.4
State Street Target Retirement 2020 Fund	\$150,785,868	19.7	9.8	8.9	8.0
State Street 2020 Custom Index		19.7	9.7	8.9	8.1
Morningstar Target-Date 2020		18.2	9.2	8.4	6.6
<i>Variance State Street 2020 Custom Index</i>		0.0	0.1	0.0	(0.1)
<i>Variance Morningstar Target-Date 2020</i>		1.5	0.6	0.5	1.4
State Street Target Retirement 2025 Fund	\$289,394,916	23.9	11.7	10.9	9.2
State Street 2025 Custom Index		23.9	11.7	10.9	9.2
Morningstar Target-Date 2025		21.1	10.1	9.6	7.5
<i>Variance State Street 2025 Custom Index</i>		0.0	0.0	0.0	0.0
<i>Variance Morningstar Target-Date 2025</i>		2.8	1.6	1.3	1.7
State Street Target Retirement 2030 Fund	\$336,353,566	26.9	13.0	12.0	9.9
State Street 2030 Custom Index		26.9	12.9	12.0	9.9
Morningstar Target-Date 2030		25.1	11.1	10.7	8.1
<i>Variance State Street 2030 Custom Index</i>		0.0	0.1	0.0	0.0
<i>Variance Morningstar Target-Date 2030</i>		1.8	1.9	1.3	1.8
State Street Target Retirement 2035 Fund	\$378,893,762	29.7	13.6	12.8	10.2
State Street 2035 Custom Index		29.8	13.5	12.8	10.2
Morningstar Target-Date 2035		29.5	12.2	12.0	9.0
<i>Variance State Street 2035 Custom Index</i>		(0.1)	0.1	0.0	0.0
<i>Variance Morningstar Target-Date 2035</i>		0.2	1.4	0.8	1.2
State Street Target Retirement 2040 Fund	\$387,394,627	32.4	14.0	13.4	10.4
State Street 2040 Custom Index		32.5	14.0	13.4	10.5
Morningstar Target-Date 2040		33.1	12.9	12.6	9.2
<i>Variance State Street 2040 Custom Index</i>		(0.1)	0.0	0.0	(0.1)
<i>Variance Morningstar Target-Date 2040</i>		(0.7)	1.1	0.8	1.2
State Street Target Retirement 2045 Fund	\$409,201,690	35.0	14.4	14.0	10.7
State Street 2045 Custom Index		35.1	14.4	14.0	10.7
Morningstar Target-Date 2045		35.7	13.5	13.3	9.8
<i>Variance State Street 2045 Custom Index</i>		(0.1)	0.0	0.0	0.0
<i>Variance Morningstar Target-Date 2045</i>		(0.7)	0.9	0.7	0.9
State Street Target Retirement 2050 Fund	\$523,670,775	36.5	14.7	14.1	10.8
State Street 2050 Custom Index		36.6	14.7	14.2	10.8
Morningstar Target-Date 2050		36.8	13.6	13.4	9.7
<i>Variance State Street 2050 Custom Index</i>		(0.1)	0.0	(0.1)	0.0
<i>Variance Morningstar Target-Date 2050</i>		(0.3)	1.1	0.7	1.1
State Street Target Retirement 2055 Fund	\$536,782,035	36.5	14.7	14.1	10.8
State Street 2055 Custom Index		36.6	14.7	14.2	10.8
Morningstar Target-Date 2055		37.4	13.8	13.7	10.1
<i>Variance State Street 2055 Custom Index</i>		(0.1)	0.0	(0.1)	0.0
<i>Variance Morningstar Target-Date 2055</i>		(0.9)	0.9	0.4	0.7

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
State Street Target Retirement 2060 Fund	\$206,237,425	36.5	14.7	14.1	N/A
State Street 2060 Custom Index		36.6	14.7	14.2	N/A
Morningstar Target-Date 2060		38.0	13.8	13.8	N/A
Variance State Street 2060 Custom Index		(0.1)	0.0	(0.1)	N/A
Variance Morningstar Target-Date 2060		(1.5)	0.9	0.3	N/A
State Street Target Retirement 2065 Fund	\$4,554,654	36.5	N/A	N/A	N/A
State Street 2065 Custom Index		36.6	N/A	N/A	N/A
Morningstar Target-Date 2065+		38.9	N/A	N/A	N/A
Variance State Street 2065 Custom Index		(0.1)	N/A	N/A	N/A
Variance Morningstar Target-Date 2065+		(2.4)	N/A	N/A	N/A
TIER 1					
State Street S&P 500 Index Fund	\$1,776,935,277	40.8	18.7	17.6	14.8
S&P 500 Index		40.8	18.7	17.6	14.8
Morningstar Large Blend		39.9	16.2	15.6	12.5
Variance S&P 500 Index		0.0	0.0	0.0	0.0
Variance Morningstar Large Blend		0.9	2.5	2.0	2.3
State Street Bond Market Index Fund	1,101,658,584	(0.4)	5.4	3.0	3.3
Bloomberg Barclays U.S. Aggregate Index		(0.3)	5.3	3.0	3.4
Morningstar Intermediate-Term Bond		0.6	5.1	3.2	3.4
Variance Bloomberg Barclays U.S. Aggregate Index		(0.1)	0.1	0.0	(0.1)
Variance Morningstar Intermediate-Term Bond		(1.0)	0.3	(0.2)	(0.1)
State Street S&P Mid Cap Index Fund	771,151,206	53.2	13.1	14.3	12.3
S&P 400 Index		53.2	13.2	14.3	12.4
Morningstar Mid-Cap Blend		50.1	12.9	13.4	10.7
Variance S&P 400 Index		0.0	(0.1)	0.0	(0.1)
Variance Morningstar Mid-Cap Blend		3.1	0.2	0.9	1.6
State Street Global All Cap Equity ex-U.S. Index Fund	870,151,802	36.9	9.6	11.3	5.8
MSCI ACWI ex USA IMI (Net)		37.2	9.4	11.2	5.7
Morningstar Foreign Large Blend		33.5	8.3	9.9	5.4
Variance MSCI ACWI ex USA IMI (Net)		(0.3)	0.2	0.1	0.1
Variance Morningstar Foreign Large Blend		3.4	1.3	1.4	0.4
BlackRock Government Short-Term Investment CL F	223,356,357	0.1	1.3	1.1	N/A
BofA Merrill Lynch US 3-Month Treasury Bill Index		0.1	1.3	1.2	N/A
Variance BofA Merrill Lynch US 3-Month Treasury Bill Index		0.0	0.0	(0.1)	N/A
BlackRock S&P Small Cap 600 Equity Index CL F	187,208,825	67.6	12.2	N/A	N/A
S&P SmallCap 600 Index		67.4	12.2	15.8	N/A
Morningstar Small Blend		60.2	10.8	N/A	N/A
Variance S&P SmallCap 600 Index		0.2	0.0	N/A	N/A
Variance Morningstar Small Blend		7.4	1.4	N/A	N/A
BlackRock Emerging Markets Index CL F	146,896,334	40.7	11.2	12.9	N/A
MSCI Emerging Market (Net)		40.9	11.3	13.0	N/A
Morningstar Diversified Emerging Mkts		41.5	11.1	11.8	N/A
Variance MSCI Emerging Market (Net)		(0.2)	(0.1)	(0.1)	N/A
Variance Morningstar Diversified Emerging Mkts		(0.8)	0.1	1.1	N/A
TIER 2					
Stable Value Fund	\$1,234,066,616	2.0	2.4	2.3	2.3
Barclays Int Gov/Credit A or Higher Index		(0.6)	4.3	2.3	2.5
Hueler Universe		2.0	2.3	2.2	2.1
Variance Barclays Int Gov/Credit A or Higher Index		2.6	(1.9)	0.0	(0.2)
Variance Hueler Universe		0.0	0.1	0.1	0.2

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
Dodge & Cox Stock Fund	696,510,308	58.5	15.4	17.2	13.8
<i>Russell 1000 Value Index</i>		43.7	12.4	11.9	11.6
<i>Morningstar Large Value</i>		42.5	11.6	12.0	10.6
<i>Variance Russell 1000 Value Index</i>		14.8	3.0	5.3	2.2
<i>Variance Morningstar Large Value</i>		16.0	3.8	5.2	3.2
Jennison Large Cap Growth Fund	612,338,260	43.9	26.4	27.5	N/A
<i>Russell 1000 Growth Index</i>		42.5	25.1	23.7	N/A
<i>Morningstar Large Growth</i>		41.6	22.2	21.4	N/A
<i>Variance Russell 1000 Growth Index</i>		1.4	1.3	3.8	N/A
<i>Variance Morningstar Large Growth</i>		2.3	4.2	6.1	N/A
American Funds EuroPacific Growth R6	361,501,738	40.1	13.8	14.5	8.3
<i>MSCI EAFE Index - Net Div</i>		32.4	8.3	10.3	5.9
<i>Morningstar Foreign Large Blend</i>		33.5	8.3	9.9	5.4
<i>Variance MSCI EAFE Index - Net Div</i>		7.7	5.5	4.2	2.4
<i>Variance Morningstar Foreign Large Blend</i>		6.6	5.5	4.6	2.9
Voya Small Cap Growth Equity Fund	174,578,910	42.0	10.7	14.1	11.9
<i>Russell 2000 Growth Index</i>		51.4	15.9	18.8	13.5
<i>Morningstar Small Growth</i>		54.3	18.4	20.2	13.4
<i>Variance Russell 2000 Growth Index</i>		(9.4)	(5.2)	(4.7)	(1.6)
<i>Variance Morningstar Small Growth</i>		(12.3)	(7.7)	(6.1)	(1.5)
T. Rowe Price Mid-Cap Value Fund	149,647,090	50.5	10.9	12.0	11.5
<i>Russell Midcap Value Index</i>		53.1	11.9	11.8	11.7
<i>Morningstar Mid-Cap Value</i>		55.5	10.7	11.6	10.4
<i>Variance Russell Midcap Value Index</i>		(2.6)	(1.0)	0.2	(0.2)
<i>Variance Morningstar Mid-Cap Value</i>		(5.0)	0.2	0.4	1.1
PIMCO Total Return I Fund	123,217,585	1.5	5.8	3.8	3.8
<i>Bloomberg Barclays U.S. Aggregate Index</i>		(0.3)	5.3	3.0	3.4
<i>Morningstar Intermediate Core-Plus Bond</i>		2.9	5.7	3.7	3.8
<i>Variance Bloomberg Barclays U.S. Aggregate Index</i>		1.8	0.5	0.8	0.4
<i>Variance Morningstar Intermediate Core-Plus Bond</i>		(1.4)	0.1	0.1	0.0
Artisan Mid Cap Fund	185,638,133	41.6	28.5	23.0	15.9
<i>Russell Midcap Growth Index</i>		43.8	22.4	20.5	15.1
<i>Morningstar Mid-Cap Growth</i>		48.2	21.0	19.9	13.6
<i>Variance Russell Midcap Growth Index</i>		(2.2)	6.1	2.5	0.8
<i>Variance Morningstar Mid-Cap Growth</i>		(6.6)	7.5	3.1	2.3
Virtus Ceredex Small-Cap Value Eq I	76,363,376	54.4	6.1	9.3	9.4
<i>Russell 2000 Value Index</i>		73.3	10.3	13.6	10.8
<i>Morningstar Small Value</i>		71.0	9.3	12.2	9.9
<i>Variance Russell 2000 Value Index</i>		(18.9)	(4.2)	(4.3)	(1.4)
<i>Variance Morningstar Small Value</i>		(16.6)	(3.2)	(2.9)	(0.5)
Prudential High Yield Fund	45,508,815	15.7	8.6	7.8	N/A
<i>Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		15.3	7.2	7.3	N/A
<i>Morningstar High Yield Bond</i>		14.5	6.0	6.1	N/A
<i>Variance Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		0.4	1.4	0.5	N/A
<i>Variance Morningstar High Yield Bond</i>		1.2	2.6	1.7	N/A
TIER 3					
Self Directed	311,392,775				
TOTAL	\$12,399,536,905				

Loan Fund: \$197,461,385

State of Michigan Retirement System

BASKET CLAUSE REVIEW

State of Michigan Investment Board Meeting
September 16, 2021



Karen M. Stout, CPA, CGFM
Administrator
Trust Accounting Division

SMRS

Basket Clause Investments

6/30/21

<u>Asset Class</u>	<u>Value</u>
Total Absolute Return	\$ 4,709,769,152
Total Real Return and Opportunistic	765,997,383
Total Fixed Income	<u>78,917,134</u>
Total Basket Clause Investments	<u><u>\$ 5,554,683,669</u></u>

The basket clause investments on June 30, 2021, were \$5.6 billion or 5.9% of the total portfolio value of \$94.1 billion.

The Public Employees Retirement System Investment Act, 1965, PA 314, MCL 38.1132 *et seq*, authorizes the State Treasurer to invest up to 30% of the system's assets in investments "not otherwise qualified under the act." MCL 38.1140d (1) commonly referred to as Section 20d (after the authorizing section of PA 314) or Basket Clause investments, gives the State Treasurer the flexibility to take advantage of market opportunities not specifically authorized in PA 314 while conserving protections against imprudent investment.

Disclaimer



This presentation was given solely for the purpose of explaining the structure, investment process, and returns for the State of Michigan Retirement System. It should not be interpreted in any way as financial advice.